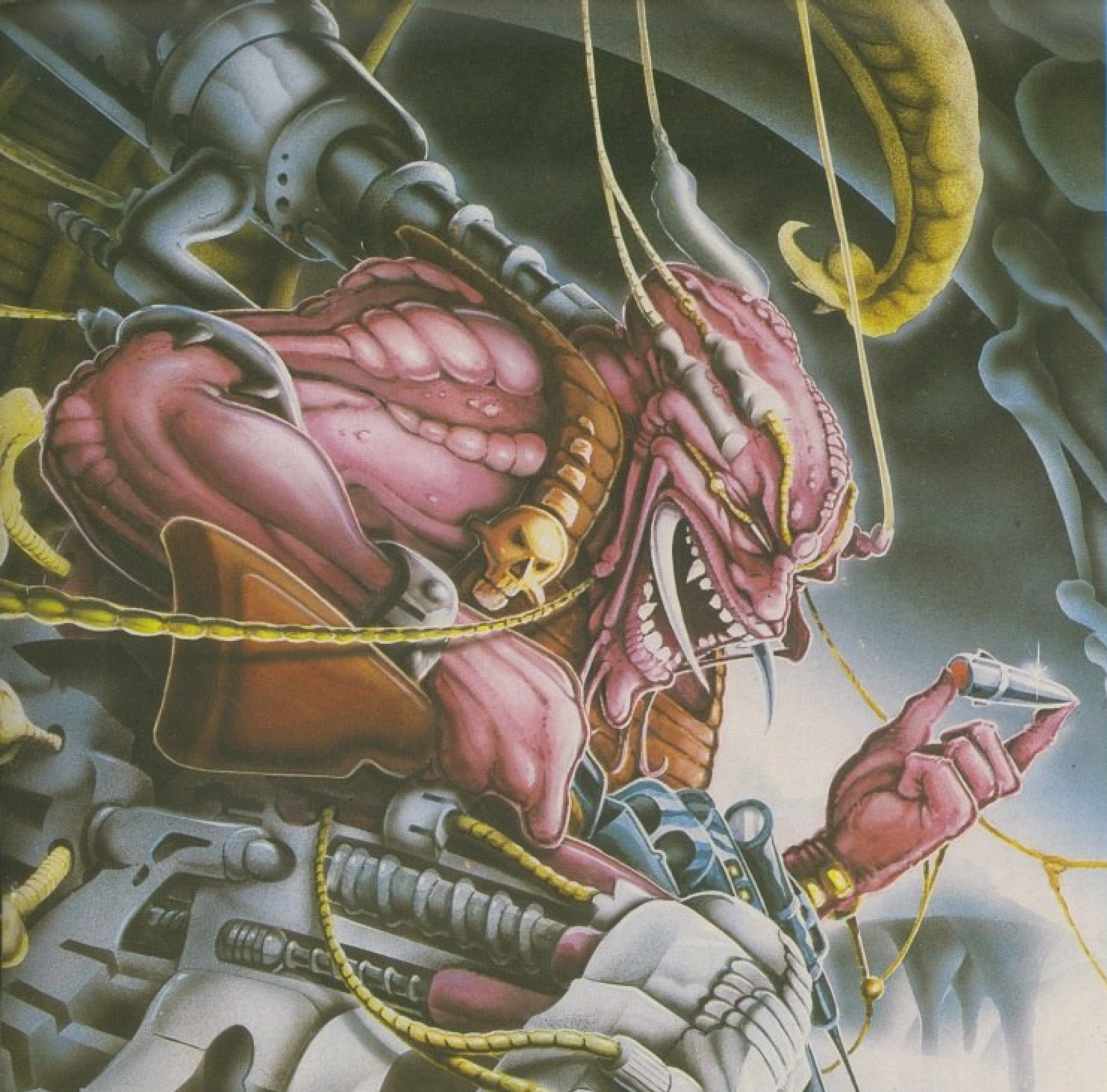
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Number 11
April 1990
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AMIGA COMPUTING



ISSN 0954-5948



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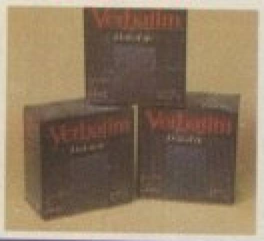
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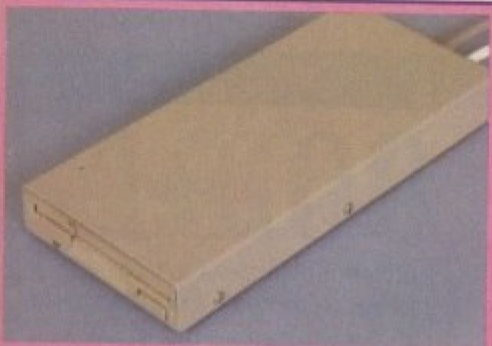
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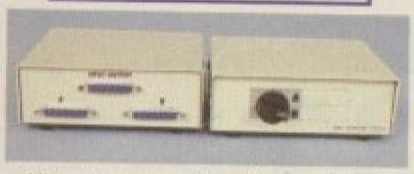


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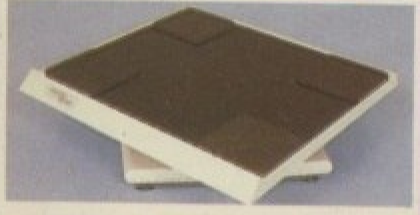
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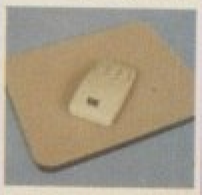
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74 CHAOS - A HITCH IN TIME
Explore the universe with your computer. Find out where Newton went wrong with the first of Alastair Scott's three-part series.



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35 SOUND BLASTER
John Kennedy is seduced by a siren gizmo which makes the evil meanies sound sweet and amplifies the subtle nuances of alien death.

BUSINESS

67 HYPERWARE WITH ULTRACARD
Once the sole domain of the Mac, Hypermedia is now appearing on an Amiga near you. John Kennedy checks to see if it's all hype.

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80 ICONS THE EASY WAY
Jeff Walker explains everything you ever wanted to know about our cute little friends. Icon see this will be a good one (groan).

AMIGA ARCADE

36 HOTTEST ACTION
There is no let up as new releases roll in. What will you be playing this summer? The Bitmaps have a lot to offer. Plus: Green saves Universe.

DTP

69 PAGESETTER II THE SEQUEL
Nic Veitch sticks a pillow up his jumper and does his Orson Wells impersonation. "Probably the best DTP package in the world".

PROGRAMMING

85 THE ONLY GAME IN TOWN
A simple solitaire proggy for you to play on your own. Well, you meet a better class of people. Michael O'Riley offers the Basic code.





HARDWARE

90 STAR XB24 DOT MATRIX
Take a 9 pin dot matrix and add 15 more pins. What difference does it make to quality? More to the point, how much does it cost?

PROGRAMMING

93 PUT SOME POWER INTO YOUR BASIC

Fast graphics from Basic with minimal hassle, what more could you want? What? You want it to tell the time too? Well, OK then...

PORTFOLIO

97 ARTISTS' SHOWCASE

The Amiga has the best graphics, and now *Amiga Computing* has the best of the artwork. This month we display the work of Jonathan Read.

MACHINE CODE

100 TRACK DISPLAY

Oliver Prill presents a neat bit of code to help you keep an eye on the goings on within your floppy drive and to exercise your assembler.

GAME KILLER

107 MAX THE HACKS

Revealed the morse code which gives infinite lives in Rainbird's super strange Weird Dreams. Plus bugs which will help you prosper.

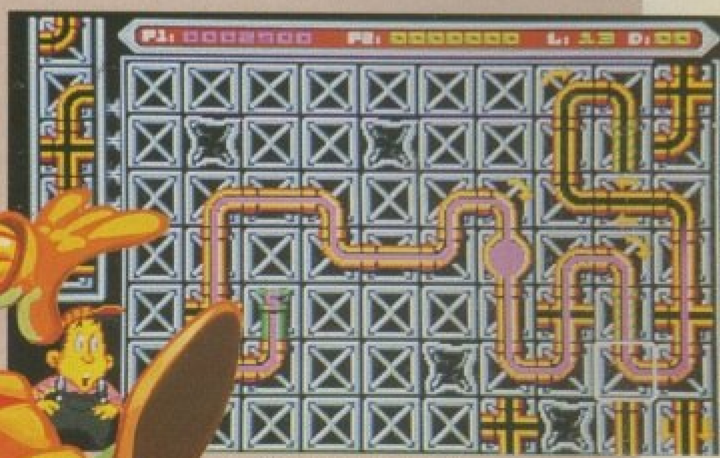
TAILPIECE

114 CLOSE GADGET

Who were those masked men? Why did they visit US Gold all dressed as Batman? Plus almost nothing else. Serious? Nah, not this month.

GAMES REVIEWS





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Hound of Shadow – Page 58

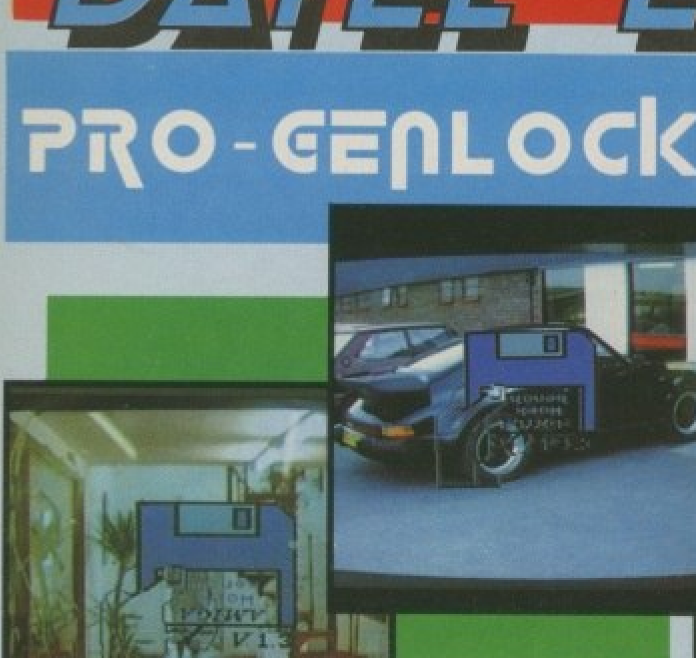
- Pipemania scores: The most addictive game ever
- Dare you enter the Vortex? You have no choice
- Dr Plummet's House of Flux, Asteroids to you
- The Untouchables: Bullets fly, gangsters die
- Napoleon meets his Water... er... Austerlitz
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- Undersea fun in X-Out. Great for 20 squid
- Explore the secrets of the Demon's Tomb
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- Lose your heart to a Starflight trooper
- Hewson's 5th Gear will drive you mad
- Kick Off Extra Time. Anco's home win
- Track down the Hound of Shadow

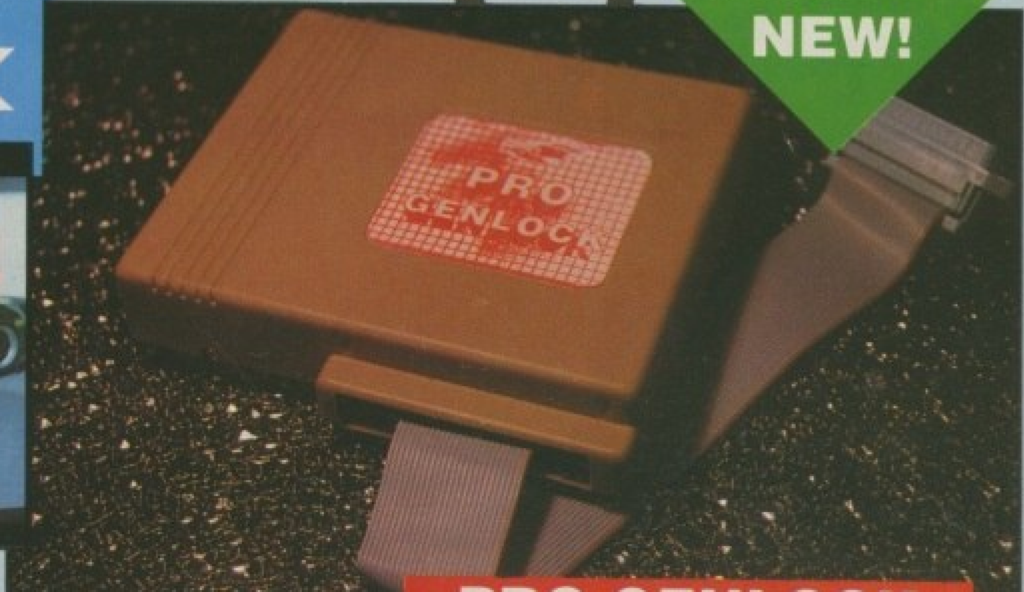


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DATEL ELECTRONICS

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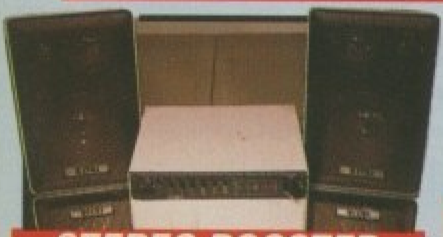
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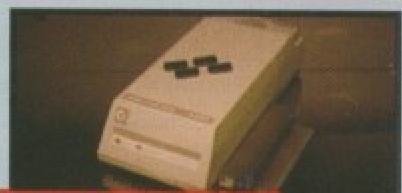
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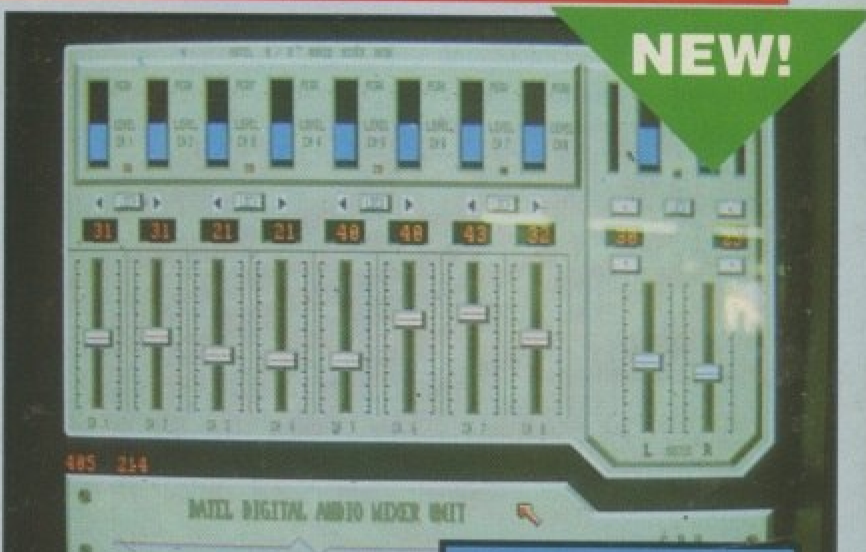
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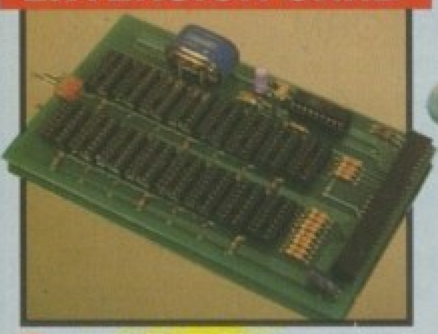


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AMIGA SCENE

CBM fury at CAA leak

NEWSPAPER stories which revealed that the Civil Aviation Authority (CAA) is using Amigas to train pilots have raised Commodore's ire. Partly because Commodore has wanted to release the information for some time and were asked not to by the CAA but mainly because Computer Weekly, a trade magazine for data processing managers, described the Amiga 2000 with the headline "Flight Controllers to train on games kit".

The lucrative contract, which was won in the face of stiff opposition from seven rivals, including simulation experts Redifusion, uses a Hi-Tension graphics board which has a pixel resolution of 1,280 by 1,024 with 256 colours capable of 32 million pixels per second.

Touch screens from Forefront technology are used in a design put together and written by the CAA's Air Traffic Evaluation Team.

The CAA is reported to want 24 training systems initially, with plans to install more at airports around the country.

The first units are going into the Air Traffic Controllers College at Hurn near Bournemouth with more systems at Manchester and London City Airports.

While the CAA system is an exciting use of the Amiga, and allows for great cost savings in air traffic controller training it is not a flight simulator.

For that you'd have to go to Israel where the Air Force is using A2000s as the instructor's console with the pilot sitting behind an expensive Silicon Graphics workstation.

It is a credit to the Amiga that perhaps the most succesful air force in the world should choose the Commodore machine.

Commodore launches education initiative

CBM has launched Creative Education for the 90s, a new initiative designed to reinforce its commitment to education and incorporating two national competitions for schools and colleges.

The first is a joint effort by Commodore and a national young adult paper The Indy. Aimed at pupils from 13 to 16, it offers £15,000 worth of computer equipment as prizes.

Entrants are asked to render an abstract idea into a visual graphic form to promote conceptual thinking. It is split into sections for schools with Amigas and those without.

First prize for each of the sections is worth £4,500 and includes four complete Class of the 90s bundles with monitor and disc drive. Two further packages worth £2,500 are offered as second prizes.

At the third prize level, schools with Amigas can win two sets of "Class of the 90s" software upgrade and those without get one Class of the 90s bundle.

Ideas to be put into graphic form cover all areas in the national curriculum including communication, health education, citizenship, economic understanding, environment, industrial under-



Steve Franklin...launched new compaign

standing, personal education, social and moral education, numeracy and information retrieval.

The second Commodore competition is a business education challenge to encourage students to use computers and relate them to a real life project. It invites teams to prepare and execute a marketing communications program for their school or college.

Open to teams of students on business or information technology courses, the project is to be carried out during the autumn term with written submissions to be in by December 15.

Original applications for entry must be made by June 30. Short-listed finalists will each receive a Commodore Professional Series computer and software with which to prepare their final presentation for judging in Spring 1991.

"Education is more than simply the acquisition of knowledge, it is about the development of skills required to earn a living", said CBM's managing director, Steve Franklin, launching the new initiative.

"CBM believes the future of this country rests in educating its young to meet the demands of this decade, in which the use of computers and creative thinking will walk hand in hand".

Schools wanting further information can contact Commodore on 0628 770088.

Diagnosis by Dr Amiga

BY the end of 1990 the Amiga 2000 will revolutionise medical ultra-sound scanning diagnosis if a project at Imperial College, London is successful.

Researchers Dr.Chris Burrell and Harald Wilson are working on a system which will use the Amiga to produce stable 3D images on a high resolution colour graphics workstation. An improvement on the current 2D systems, it will enable images to be rotated on screen, cut in half and scrutinised in portions, opening up new diagnostic horizons and dramatically cutting costs.

The Imperial team has developed its own ultra sound probe which disperses electrical pulses before sending them to the computer.

Still in its infancy, the

➤

Amiga 3000 rumours fly

WHILE Commodore is keeping mum about the truth behind the Amiga 3000 (See *Amiga Computing* August 1989), the rumourmongers are having a field day. A bit of honest advice to anyone watching the future of the Amiga is not to believe all you read.

It is much safer to look at what Commodore has already released and announced:

- The 32 bit 16 MHz 68030 card is shipping in the US.
- Commodore showed Unix V.4 for this card in New York last January.
- The new ECS, which is shipping in A2000s, has a meg of chip ram.
- The original Agnus chip design allowed for 2 meg of chip ram.
- X-Windows is available for the Amiga.
- Unix requires a lot of ram and hard disc space.
- Workbench 1.4 will be a major upgrade.

The Amiga 3000 is bound to be a substantial improvement on what we have seen before. The truth will be revealed at the Hanover Show.

system will be easy to use and will produce images which are easy to understand. Its cost will be minimal when compared with present systems.

In the long term, it is hoped the Amiga will help diagnose major health problems such as heart disease and also be used as a useful training aid to clinic biology, anatomy and the effects of drugs on the human body.

The research team is using a 2000 with an AT bridgeboard, 20meg autoboot hard disc and 14in multisync monitor.

Expansion cards for all

THE increased power and versatility offered to Amiga 2000 owners by the Hard Frame 2000 expansion card is soon to be available to users of 500 and 1000 machines.

Oasis (01-298 0060), UK distributor of MicroBotics cards with Quantum drives, is to launch new Hard Frame 500 and Hard Frame 1000 products and may even combine them into one card called Eight Star for common use on both machines.

"Our best technology so far has been on the 2000 and we have now decided to make this available to owners of 500 and 1000 machines", said Simon Coombes of Oasis. "By re-engineering the 2000 versions, we also hope that we may be able to bring down the prices".

The SCSI hard disc cards from Oasis are fitted with higher capacity, faster 3.5in drives from Quantum. Present prices are £599 for 42Mb, £869 for 84Mb and £999 for 105Mb. They were on show at the recent 16 Bit Computer Fair at London's Horticultural Halls.

Late arrivals

SOME of the items on Commodore's latest dealer price list were announced so long ago they don't seem new any more. But they are.

The new hard drive controller, the A2091, is available with 20 or 40 meg drives and the long awaited A2024 high resolution with a 1024 by 1008 display have at last made it to the list. No prices are included and you will have to contact your local dealer for availability.



Due to an unprecedented demand from readers, the *Amiga Computing* cover disc is back next month – and it's better than ever, with a massive megabyte of super software for your Amiga.

Don't miss next month's issue!

School goes for the 500

CHILDREN with learning difficulties in Birmingham are using Amiga 500s to help with their problems. Selly Oaks School has imported 40 of the Commodore machines for music, business studies, word processing, spreadsheets, databases, graphics, art, design and drama.

They have proved so popular that pupils are given free access to them during break times and staff also use them to prepare coursework and keep childrens' records.

"This year we plan to use the machine to teach French and German. There's no end to its capabilities", said teacher Malcolm Pomray.

Amiga Computing breezes into the 1990s

A NEW look *Amiga Computing* is on the way with the signing of a deal between its publishers Database Publications and computer magazine house Gollner Publishing.

This will bring Gollner's revolutionary colour printing process into play with more colour, more screen shots and even brighter page design.

It will also bring new ideas to the editorial content, further extending the magazine's scope.

"The most immediate changes our readers will notice will be visual", said commercial director of Database Publications David Hirst. "Our merger with Gollner Publishing gives us access to better production techniques with less restrictions on design.

"*Amiga Computing* has taken great strides since it was launched two years ago and the input of new editorial ideas promises to take it even further in future months to cover all aspects of computing with the Amiga".

Following their alliance, Database and Gollner have set up Interactive Publishing, a new company which takes over *Amiga Action*, *ST World* and *ST Action* from Gollner and *Amiga Computing* and *Atari ST User* from Database. Other Database titles – *PC*, *The Micro User* and *Electron User* – are not involved.

Chairman of the new company is Derek Meakin who is also chairman of Database Publications and the controlling Europress Group.

"For several years, we have admired the understanding of the computer entertainment market shown by the enthusiastic Gollner team, together with its highly innovative and technologically advanced approach to magazine production", he said.

"Interactive Publishing is in an ideal position to capitalise on the pioneering work of Hugh Gollner and his colleagues. The five magazines that form the nucleus of the new company already have a well established position in the leisure computing marketplace and new titles are being planned that will exploit the latest technical achievements to the full".

Managing director Hugh Gollner said: "For a long time now, the team at Gollner Publishing has felt the need for more strength in terms of both finance and management to fully exploit the commercial possibilities of the skills that have built up our existing magazine titles. Database, with ten years experience in computer publishing has that strength".

Existing production centres at Macclesfield and Chichester are being retained, as are all present employees.

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Friends of the environment

AMIGA software house Digita Interntional (0395 268893) has gone green and director Jeremy Rihll hopes that others in the software business will be kind to the environment and follow suit.

"Packaging, manuals, brochures and box inserts for every Digita product are now printed on environment friendly paper", he told *Amiga Computing*.

"Although this costs 20 per cent more, it is a small sacrifice and I would encourage those manufacturers who require high quality paper beyond the standards of fully recycled paper to seriously consider the environment friendly alternative".

Jeremy has toyed with taking the green path for some time but could not find a re-cycled paper of the right quality. He then discovered the Environment Friendly Paper range which is made of 40 per cent straw and is free from chlorine.

Because of its higher quality, it still contains some wood pulp but in much smaller quantities than normal paper.

"Most of us have had our cars converted and use bio-degradeable products so I thought it was time I used the same ideas with my business", he added.

"This alternative is better for the environment but still provides the right quality so there is no reason why other companies should not use it".

No Unix for Europe

HIGH level discussions at Commodore US may mean long delays or the possible non-introduction of Amiga Unix systems in Europe. This would appear to be a response to the transatlantic image gulf between America and Europe.

While the general image of the Amiga over here is that it is the hottest games computer, with sales of nearly 100,000 Batman packs to support this conclusion, the US experience is very different.

There is a much larger proportion of Amiga 1000 and 2000s with the computer seen as a powerful multi-tasking system.

The infrastructure of the dealer base is very different, while in the UK more Amigas are sold through high street multiples, these shops are the province of games consoles in the US with Amigas being sold by specialist dealers.

Commodore US is in a much better position to support a complicated system like Unix. It could well cost Commodore more to train enough European staff to handle users and developers inquiries than the company could earn by selling the new A3000 and A3500 machines. This is despite Unix being the most exciting area of expansion in the business market.

The European Unix community is much less institutionalised than that in the US. This means that Commodore's trail blazing with a System V version 4 has to compete with similar systems from local companies.

Even the usually slow to react British giant ICL has a V.4 machine. And as the workstation market hots up even a 25MHz '030 machine with 700 by 500 graphics has to struggle to keep up. While no decision has yet been taken, all these factors may combine to keep Unix in the US.

Midi gets its own show

MIDI music is a growth market and devotees will have a feast in store on April 7 and 8 when the Midi Music Show makes an appearance at the Novotel exhibition centre in Hammersmith.

Organisers Westminster Exhibitions (01-549 3444) claim the event will give visitors a view of "tomorrow's music technology - today" and say there will be more than 60 companies exhibiting state of the art computer music technology.

The first show to recognise Midi technology in its own right, it will include keyboards, soft and hardware, peripherals and consumables from America, Europe and the UK aimed at both professional and home users.

During the show there will be seminars, demonstrations and conferences covering subjects such as sampling, creative editing and sequencing.

Enhanced Beeb emulator

VERSION 1.1 of the BBC Emulator should cure many of the problems users have experienced with the first version. While there have not been many bugs to fix, a lot of features which were outside the original specification have now been implemented.

The emulator will now load a saved screen image, but cannot use direct screen writes.

All the GCOL modes which the BBC Micro supports are now available, as is the envelope command.

Most important is the ability to address other programs as sideways roms which leaves the way open for a program to read BBC discs on the Amiga.

Thinking ahead

TWO Birmingham teachers have produced a new software package which allows most Amiga programs to be run with a Concept Keyboard.

To initially target the education market, it will bring the simplicity of the keyboard to Amiga applications as diverse as word processing, painting, video titling and special effects.

Trading as Think Ltd., they are the developers of Commodore's Class of the 90's education resource pack, and CBM has already shown great interest in this latest product which is due for launch in the next few weeks.

The software comes with the necessary leads and is designed for use with the standard Star Micro-Terminals Concept Keyboards, which were primarily for children with special needs but are now widely used in primary schools.

The easy to use program allows entry by mouse and Concept Keyboard and has the ability to search through data and operate the overlays within the program.

It includes a parser which recognises the name of the keys and supports keyboard, menu and mouse operations. Initial versions work with serial devices, but a version for people who already have parallel devices will follow.

Easy overlay can be activated by double clicking on its associated icon. These can be changed at any time while other programs and even other overlays are running.

There is no need to change startup files or buy software specially written for the Concept Keyboard.

Think Ltd. is currently preparing special keyboard overlays in French, German, English, Welsh and Braille. Some examples will be sold with the software and more extensive packages will be sold separately.

In addition to Commodore's interest, Think's latest product has attracted attention from many other countries including Sweden, Australia and Canada.

Think can be contacted at Prudential Buildings, 46C High Street, Erdington, Birmingham, B23 6RH.

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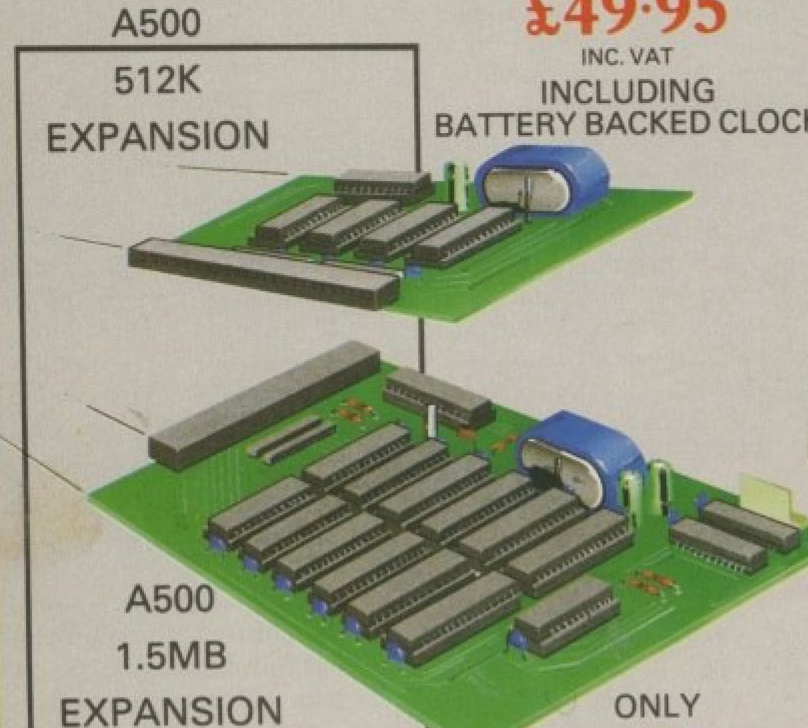
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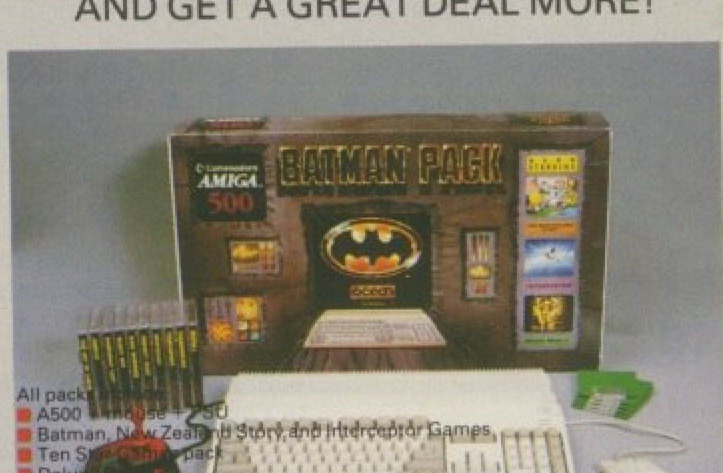
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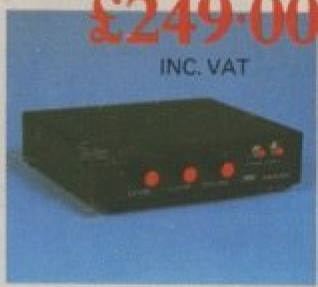
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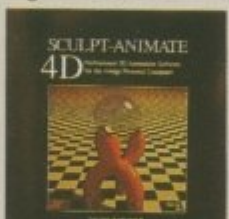
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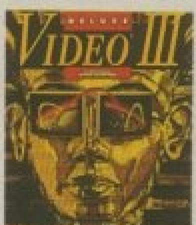
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Amigans need no longer be deskbound

Stewart C. Russell's Z88 has formed an alliance with his Amiga

YOU can read this all right, can you? Good; since this article was written on a Z88, and then piped across to Protext on my Amiga using The Music Suite's Z88-Amiga Link software, it shows that the Link actually works.

You might be wondering why an Amiga user would want a Z88; for all its myriad wonderfulness, the Amiga does not fare too well in the portability department.

The Z88, at just under a kilo and the same size as an A4 pad, has just the right balance between size and ease of use for situations where you don't have a desk or a power socket handy. And as both the Z88 and the Amiga have an RS-232 port, The Music Suite's software acts as a filter and storage buffer for the transmitted data.

Data can be exported from the Z88 to work with a good selection of Amiga applications. Text from the Z88's integrated system Pipedream can be made into a properly formatted Protext or Scribble document (complete with underlines and other control codes), a Superbase data file (as long as the text is well-behaved) or a plain Ascii file.

That last option will allow most applications to derive some sense from the data. You can also send Amiga text back to the Z88 if the urge takes you.

The way that Z88-Amiga Link handles the transfers is by fooling the Z88 into thinking that the Amiga is actually a printer; text is "printed out" from Pipedream into a buffer, which can then be saved out or sent to the screen or printer.

It's possible to cut out the buffering altogether and use the Amiga to spool Z88 printer output to a parallel printer; this saves you spending £25 on a Z88 parallel printer interface.

The sparse documentation fails to tell you to set your baud rate to 9600, and you really have to use the Z88's default Epson printer driver. The program's only screen is decorated with plain gadgets and windows, which sometimes flicker at you for no adequately explained reason.

The disc boots into the CLI (yeuch!) and no icons are given to imported files, even although the Link can run from the Workbench. Presentation is hardly super-slick.

Z88-Amiga Link functions faultlessly, and most of the presentation problems should be solved in the now-complete version 1.1.

At £19.95 for the software and £12.95 for the lead it's inexpensive enough for every Z88 and Amiga owner to have it, yet handy enough to merit the travelling Amigan splashing out on a Z88.

For more details contact the Music Suite on (0239) 711343

I was a teenage hacker

Simon Rockman looks at a new modem

SPEED counts. And Dataphone's new Profour is fast. In the fledgling days of modem use, 300 baud was the norm. For those of us who spent far too long on-line using dodgey accounts to play multi- user games, 110 baud seemed adequate.

Today 1200 bps is pretty common, and it is about the fastest speed BT's cranky old phone lines can cope with. There are plenty of 2400 bps modems, but you need a good line to use one.

The solution is error correction – use a noisy line but encode the data so that the system you are talking to knows of any errors and keeps sending until both ends are convinced that only the intended information got through.

Assuming that the doubling of line speed is enough to cope with all this re-transmission, things should run faster and cleaner.

Such a system is MNP. In its simplest form this provides error correction, as you move up in price and performance MNP includes compression which gets more bytes down the line.

Such a method of compression and correction is MNP 5. At £458.85 the cheapest modem with this is the Dataphone Profour. Designed and built by a small British company it doesn't have the finish of a modem built by one of the multi-nationals like Hayes, Pace and Dowty. But then it doesn't have that kind of £700 price tag either.

Modems are like little girls. When they are good they are very, very good. When they are bad they are horrid. The magic of error correction amplifies this.

Using the Profour with a variety of different services produced very different results. MicroLink's Istel node steadfastly refused to communicate with the device. Cix was a bit iffy, not always working but direct dial to Bix in America was wonderful. Good fast connections and 300 cps downloads.

While on test the modem had a few problems. It is a bit slow to react to things like resets which confused JRComm. Changing baud rates didn't always work, which meant that the dialing directory didn't. Some of these problems seemed related to heat – cooling off reduced idiosyncrasies. Supplier, SEG Communications, which is Dataphone's agent, traced this to dirt which got into the unit at manufacture.

The Profour is not all SEG would have you believe. It is not as good as rivals at half the price, but it is still very good value for money. For more details contact Spalter Electronics Group on 01-959 3377.

Hi, I'm the new mail man. Man. It's my job to sort your scribbin's and spill the beans on the problems we all have when DF0: starts to whirr. So if you've got something to say, say it to me.

The best letters will be sent prizes of up to £100, so get a copy of Protext into your drive pronto. Drop me a line at Ezra Surf's Postbox (ESP), Amiga Computing, Second Floor, North House, 78-84 Ongar Road, Brentwood, Essex, CM15 9BG.

Ezra



Scan the man

I WOULD like to buy a scanner. Not a handy scanner, an A4 flat bed scanner. Datel Electronics has advertised a scanner, printer and photocopier in your mag, but I have phoned them up to ask a couple of questions about it and they said that they don't sell it any more.

Does anyone make one? Can I print with it using a completely different package and use the photocopier without having to switch on the computer?

The unit scans at 200 DPI (dots per inch). Is that good? What sort of quality would I get for scanning a photograph?

Is there be any way I can scan in colour? I know it sounds stupid as it's a black and white scanner, but what I mean is, is there anything like filters that can produce different coloured pictures and place them together to form one colour picture?

Can I scan in any software package (of course, that scans pix) instead of just the scanning software you get with it? Thanks for answering my questions.

Neil Mansell,
Canvey Island,
Essex.

Gee, I hate tricky questions like this. Most letters editors would trash them, but that's uncool so I'll try my best. Scanners are available from Gold Disk in Canada, ASDG and Digipro. The Gold Disk one costs $1,095 (US). By the time you have paid carriage, Vat and duty you are looking at the wrong side of £900.

This is based on the Canon IX12, and at 300 dpi is laser printer quality. It won't print. It won't do colour. The IX12 sucks the page through so you can't scan stuff out of books.

The IX12F is a flatbed version which sells for around £800 in the UK without the Amiga software and cable. Because the bundling deal Gold Disk has with Canon is restricted to North America, HB Marketing – the usual Gold Disk importers – cannot sell the package in the UK. Bummer. Call Gold Disk in Canada on 0101 416 828 0913.

The ASDG system is seriously expensive. Super high resolution, it'll do colour to better than TV quality. Designed for professional colour work it needs an Amiga 2000 with at least 5 megs and a big hard disc. You'll need to give the bank manager more than a box of choccies and some sweet talk.

Compared to the half a million quid Crossfield would charge you for the kind of scanning machine which was used in the production of this magazine, it's cheap. You can get a whole system on the Amiga for less than 10 grand. Call ASDG (UK) on 0923 818079.

Most hopeful sounding is the system from DigiPro. 256 grey scales, 450 dpi, £1,000. Not a printer or photocopier. It won't do colour yet, but the boffins are looking into it. Digipro is on 01-905 1030.

Crawler!

CONGRATULATIONS on producing the finest Amiga magazine ever with the best subscription offer I've ever seen (thank you for Batman). I would like to comment on the ridiculous decision to give Xenon 2 100 per cent as it puts you in the unfortunate position of not being able to give a higher rating to a better game.

When such a game comes along, do you intend giving it 101%?

Daniel Vine,
Richmond,
Surrey

Yup.

Amiga angst

PERHAPS you could help a mere Amiga 500 owner by explaining to me (or pointing me to any literature, like your back issues) about directories, libraries and files.

I haven't a clue what you're talking about when you say things about copying directories and programs such as MouseZoom. Also how do you include programs in the start-up sequence?

Richard Myer,
Pinner,
Middlesex

The best introduction to the Amiga's CLI is AmigaDos: A Dabhand guide from Dabs Press. You'll find an order form in the special offers pages of this mag. It's there because we like it.

Power to the people

PLEASE could you tell me whether the following is correct: The Amiga 500 can theoretically support up to four disc drives, but the PSU can only sufficiently power two.

If this is so, why is it not mentioned in advertisements such as Datel Electronics and by shops when I inquire about purchasing an external twin disc drive? Perhaps you could give me the address or telephone number of a company offering PSU upgrades. Thank you very much for your time and keep up the excellent work you're doing.

Michael Harris,
Taunton,
Somerset.

To misquote: "Not enough power corrupts", it can also cause your system to send an invitation to the guru.

The guys at See Bee Emm are playing safe with the one external drive per system limit. For two reasons. First their mega-naff 1010 drive draws only slightly less power than Don Henley's stage system and so the A500 won't stomach two of the things, secondly not all Amiga's are created equal and some PSUs have more umpf than others.

While plenty of Amigas will cope with two add-on drives not all will, and CBM guidelines have to cater for the puny ones.

If you want to risk it for a biscuit you can add a DF1: and a DF2: if they are low power units.

If you are the cautious type — the kind who avoids the cracks in the sidewalk — you should get a drive with its own PSU. You won't need to replace the Amiga one.

Killer doctor

THE machine has killed some of my game discs: A game decides not to load, putting up "Not a DOS disc" requester and then telling you to use "Diskdoctor".

When you finally decide to use Diskdoctor (because you've nothing to lose, anyway) it returns hard errors on all tracks, reformats the root track and retitles the disc Lazarus.

What actually happens is that this virus or whatever, actually unformats the disc and I've been informed by someone who knows about as much as me that all unfor-

➤

mated discs are called "Lazarus".

Try this: Put up Workbench; place a blank unformated disc in DF1: and you should get the usual DF1:BAD icon. Get to CLI and "Diskdoctor DF1:" on the blank, unformated disc in DF1: it will return hard errors on every track.

Go and make a cup of tea (two sugars please). Eventually, when it reaches track 79 it will format the root. When that's all stopped, go back to Workbench and the blank disc will have been renamed to Lazarus. Explain that then.

Will Green,
Lichfield,
Staffs.

Lazarus was a dude in the Bible who was dead, then the big JC made him less dead. Diskdoctor does a similar artificial respiration job on dead AmigaDos discs. So Diskdoctor renames cured discs as Lazarus.

Games are very rarely on AmigaDos discs, they use a special format which AmigaDos barfs at. So if you boot from the game, before AmigaDos gets a look in, all will be tickerty-boo. If you use Workbench first you'll get the warning.

There was nothing wrong with the disc — and if there was it could only be cured by sending the game back to the software house. Diskdoctor's magic sponge won't work on games. It'll only make things worse.

Error correction

NOW to the serious stuff. In the February issue you said use Install DF0: to install the boot sequence on your disc, this is inaccurate and ambiguous.

First of all it asks for the Workbench (unless it is all ready in DF0:) disc and installs that instead of asking for you to put in disc to be installed.

It is okay for all those lucky enough to have a second (or more) disc drive. You cannot even do Install discname because it only accepts drives (DF0:, DF1: etc).

The solution: Type Makedir ram:c. Next type copy Workbench:c/install to ram:c. I rename Workbench1.3 to Workbench because it makes life easier.

Now type copy Workbench:c/assign to ram:c. After this type Assign c: ram:c. this will make CLI look in the c directory in ram instead of Workbench's.

Now place the disc to be installed in DF0: and type INSTALL DF0:. To get back to the commands in Workbench's c directory just type Assign c: Workbench. Note you could set other commands in the ram: using the above process.

Hopefully this will be fixed in versions 1.4 so you do not have to do all this messing around.

Daniel Schostak,
Norwich,
Norfolk.

OK, so we carried the office motto of "Less is more" a mite too far, but the end result was the same. If we explained everything in minute detail each article would begin "First switch on your Amiga". But your explaination was a good 'un.

No luck PAL

I'VE a Philips 8833 monitor on my new Amiga 500 and have found that most games on it leave part of the bottom of the screen blank, but Workbench is OK.

Also some utilities need the horizontal centering adjusted and have wavy lines in the window titles. Is this normal, or do I have a faulty monitor or lead?

Dave Sheridan,
Potters Bar,
Herts.

There is a strange and alien land called America. There is a strange and alien computer called the Ess Tee. Between them they conspire to rob European Amiga owners of 56 lines of screen display.

You see, over there the NTSC telly format means they can only squeeze 200 lines. The Atari similarly can only show 200 lines. As a result software houses who have to cater for the world market on both machines don't think it worth their while to do a special 256 line version for you and me.

The wavy lines are the result of faults in the monitor. Most screens do this, and unless you want to spend many hundreds of pounds on a screen you'll have to live with it. I know I do.

Comunicating computers

BETWEEN my two systems – Amstrad 1512, Logitech ScanMan (hand held scanner), Paintshow Plus, and Commodore Amiga 500, Deluxe Paint II, Photon Paint – it should be possible to scan on the Amstrad and print on the Amiga?

I have a Hewlett Packard Paintjet colour printer. My problem is that I would like to scan then paint in colour. Is there any way I can transfer IFF files between the PC and Amiga? I know the easiest thing to do is to buy a scanner compatible with the Amiga, but I am hoping there is a cheaper way.

Brian Kidd,
Marlborough Building,
Bath.

My hugely impressive analytical brain has divided your problem into one of two formats. File format and disc format.

First the interesting one, getting PC format pics into IFF. Being brain-dead sheep, IBM users are quite content to put up with a host of file formats.

There are two ways to get these into IFF. The first is a program called HiJaak by Inset Systems. It runs on the PC and costs £99 from AP Computer Products (on 0483 722837).

Equally good for this job is Deluxe Paint II on the IBM. This can load and save in most PC formats as well as IFF. PCX is most likely to be the format you need, and both packages will cope with it.

Your next problem is disc size. You can either put a 3.5in drive on the Amstrad or a 5.25in drive on the Amiga. To read the information you'll need a transfer program. Flavour of the month is CrossDos, a program which treats Amiga, Atari and IBM discs as equals in DF0:

You'll get both the hardware and the software from Power Computing on 0234 273000. A 5.25 drive will cost about £150 and CrossDoss £30. Since the whole sheebang will come to nigh on £300 it might be better to buy an Amiga handheld scanner.

Keeping a tab on copies

GAMES prices really set me back. I know nothing about computers. but when I opened my new Amiga I find that you have to make copies of your master discs (which I think should already be in).

I was amazed how easy it is to get on to piracy when you can move the tabs over to copy the games you buy. You would think they would make the tabs solid for their own protection.

If I was not an honest person I would copy off friends. but I must be one of the few left. Anyway thanks for the article on piracy and keep up the good work in your magazine.

David Windsor,
Chilwell,
Nottingham.

Head. Wall. Bang. bang. The tabs stop you writing to a disc. not reading it. Games are protected against programs like Diskcopy using codes on the disc. Just sliding the tabs won't make things magically go away.

Costly conversion

YOUR reply to Tom Davidson regarding converting IBM files to Amiga suggestted Dos-to-Dos costing £39.95. Your other readers may be interested to know that there is a PD program available called MSDOS which will convert both IBM format and Atari format files to Amiga format.

However, due to the fact that the program requires a recoverable ramdisc, WB 1.3 or an equivalent utility is needed. The program is German in origin and is available on FF 158.

Bernie Stafford,
Wirral,
Merseyside.

Little Acorns

WE are considering setting up a software development company to produce games for the Amiga and Atari ST. We desperately need to locate artists and programmers who would be interested in working with us.

If there is anybody out there who lives in Cornwall(ish), and is looking to make a career for themselves in the software industry, then please waste no time in writing to us.

We have several great game ideas, but have been unable to commence work on them due to the lack of graphic artists. We just hope that there are some talented people who will be prepared to help us out.

Thanks in advance to *Amiga Computing* for taking the trouble to print this letter, as at the ages of 16 and 17 we are unable to afford a

normal advertisement!

Please note, we may be young, but we have been coding for two years and consider the prospect of creating careers for ourselves in the software industry very seriously – so not time wasters.

Peter Iver and Stephen Warden
Meadow Lodge. Highertown,
Truro, Cornwall TR1 3QF.

I will waste no time in writing to you, but that's 'cos I can't program. Good luck guys.

Starter help

AFTER reading Anne Scotney's letter pleading for help for beginners I had an idea. With the help of your excellent magazine I would like to start up a sort of Pen Pal club where people who know little or nothing about their Amigas could swap hints and tips and self written programs.

Here is my full address: Andy Klyen. 77 Hartham Road, Isleworth. Middlesex TW7 5EY. I have an unexpanded A500 with only the internal drive. Thanks for the brilliant Explore your Amiga – it's helped me enormously.

Andy Klyen,
Isleworth,
Middlesex

Poor taste

MY enjoyment of your normally excellent magazine was marred in the December issue by the unbelievable bad taste, not to say possible hurt, of your caption to the top lefthand illustration on page 25. I hope that editorial vigilance will reverse this lowering of your usual standards.

M A Loftus,
South Croydon,
Surrey.

We've had a number of complaints about this, and yes wrists have been slapped. In defence I'd say that the person who wrote it uses the London Underground every day and the place is still hazardous.

Crashypoos

PLEASE help me. I own a nice little 1 meg Amiga which is giving me mega problems. First off is the meg. Ever since I got the meg my computer has been crashing on me several times in a row and when I press the mouse button to reset, the power light just sits there flashing away pretending it's a mobile disco.

I turn the machine off for about 30 secs but it's still the same. Normally I have to leave it for about 15 mins before it works again. Is my meg naff? Oh better rush, I feel a Guru coming.

Daniel Cockrill,
Great Yarmouth,
Norfolk.

Sounds like the heat is on. Your ram doesn't like getting hot and goes funny when the machine has been switched on for a while. Take it back to the dealer and give him some lip.

MJ fan

I AM writing to thank you for my Michael Jackson T shirt. it is very good value because it is so big I can wear it as a dress for the next two years.

I had an Acorn Electron computer but Santa broght me an Amiga 500 for Christmas. I am writing this with Protext on my Mum's IBM type PC.

My Dad has an IBM type PC at work and he says that's why we had an Amiga for Christmas. He won't tell me what he means, but I think it's a joke.

Clare Pemberton,
Werrington,
Peterborough.

Looking for a language

I AM considering buying an Amiga 500 but cannot seem to find any Pascal packages advertised for it anywhere.

Is it possible to buy Pascal for the unexpanded A500 and if so which is the best type?

I am also a bit confused about the difference between the PAL and NTSC Amigas. Is one better than the other?

Will one eventually become standard, and if so, will it be possible to change one type to another? Thanks for a great magazine.

Peter Hewlett,
Chaldon,
Surrey.

Hisoft on 0525 718181 can sort out your Pascal problem. All British Amigas are PAL, all American ones are NTSC (generalisation). When the Enhanced Chip Set comes out – it should make 1990 (sarcasm) – the modes will be interchangeable. If you have a PAL Amiga you should have no problems.

New BBS

WOULD it be possible to let your readers know that I have just set up an Amiga-orientated bulletin board. It is called Runway A500 and is purely for Amiga users.

It can be accessed at 300/300, 1200/1200 or 2400/2400 baud, and is online 22.00 - 08:00 weekdays and 22:00 - 09:00 weekends.

It is running on a PC with a 20mb hard disc, Quadcomm modem, and Wildcat! software. Runway A500 can be contacted on 0293 884117 at the hours above. It offers PD and Shareware software to members, technical support for any software/hardware problems and has several message areas.

I find some of the letters and answers in your column of great interest – in a few cases you've tackled problems just as I've hit that particular problem myself. Please keep up the good work and the quality of editorial that you have.

Steve Sheldon,
Crawley,
Sussex.

Piracy aid

HAS anyone else spotted Mirrorsoft's mistake on Falcon? Browsing through the key disc I found details of the copy protection routines, source code and link routines. Plus examples of all of them.

I'm no hacker, cracker or anything else, but it wouldn't take an idiot to figure this one out. Try looking at block 0883 and you'll see what I mean.

They've even left the telephone number of the guy who wrote the protection stuff. Bit silly if you don't want your game cracked.

I recently had a problem with my power supply unit. The Amiga booted perfectly but the keyboard was dead, it just sat there flashing the caps lock LED.

I tried to reset the psu but to no avail. In the end I unpluged it from the mains, waited a minute, then shorted each output pin to the outer shield on the plug.

Bingo, it now works again. I can only suspect the keyboard supply voltage tripped for some reason and held itself off.

Dave Harrison,
Milton Keynes,
Bucks.

Shorting out pins on a PSU sounds a very, very silly thing to do. Mirrorsoft? Yeah, they did it with Xenon II too.

Erm, well...

WHY did the Amiga Computing with F-29 on the cover have February 1989 on it? Now that no coverdisc is included, will there be a partial refund for people (like me) who have already paid £5 too much?

Why is it illegal to copy games

Adding icons

I BOUGHT the spreadsheet G Calc from Digita soon after buying the Amiga. The files it produces do not have a corresponding info file and therefore no icon on the Workbench. How can I produce such an icon or even info file to enable me to move the files around, copy or delete them more easily?

I know I can do all these operations from CLI but that involves a lot of disc swapping at my stage of understanding of AmigaDos. I am sure that I can't be the only one who would value such a program. I would even send $10 to Augustus Gloop, Sweetnes and Light Blvd. Ca. (.....or whoever), if the program is available as shareware.

I think the magazine is great on the basis of the two issues I have bought. Do you give away a different file viewer every month? (...only joking!)

Now back to the books and the low end of the learning curve.

Colin Mercer,
Bradshaw,
Bolton.

Gluing an icon to a file is simple if you don't want to run the program. You can steal the .info file from another program, say shell.info. Using CLI **copy shell.info to data.info** *to put an icon which looks like the shell on a file called data.*

Augustus Gloop eh? Yup, I used to be a fan of Charlie and the Great Glass Elevator, but I'm grown up now.

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for one's own use – after all the games are dear enough in the first place, and my Amiga has destroyed two or three already.

If I am not allowed to back programs up, I just won't buy them in the first place. I hasten to add that I have never copied anything that I am not allowed to, and will not in the future. Thanks for a great magazine anyway. Good booklet on the Feb cover as well.

Pete Sparkes,
Langport,
Somerset.

The lame excuses department, otherwise known as Simon, claims that it was deliberate to make up for the magazine always being on sale the month before the cover date, and this was an attempt to regain the lost months.

We know better than that, don't we boys and girls. We know a cock-up when we see one.

Subscribers will get extra copies to make up for the lack of a disc.

Why is it illegal to grow cannabis if it is only for horticultural satisfaction and not for smoking? It's because you might be honest enough not to give any copied discs away, and I might be just a humble gardener but there are far too many dishonest people around, and so it is the act which must be legislated against and not the intent.

Disc death

FIRSTLY let me congratulate you on ditching the cover disc. Sound move, if I want PD I'll spend £2.50 on a disc.

Right, down to basics. As more people venture into the world of the Amiga there are going to be more cries for help like that from Pennie Jones, (letters Jan 1990).

Let me take you back to early 1988 when men were men, women were women and I discovered a mouse had two buttons. I knew nothing about our cream coloured friend.

Thanks solely to your magazine running basic tutorials on CLI, Basic and even Workbench, I now write my own demos.

The point is, why don't you, for a minimal charge, offer photocopies, reprints or even, gasp, a disc with these basic tutorials on it?

I'm sure a new amigan would want, for example, a CLI tutorial disc. Especially as the only other way is spend £13.00 on a book. Plus, this also solves your problem of getting rid of all those surplus coverdiscs you're trying to flog.

While on the subject of discs, I have over 200 and the only ones to go down have been branded (Nashua or Verbatim). True, you can get the disc replaced, but you've lost data.

I currently buy the cheapest I can get my hands on (60p a disc) and have had no complaints in over a year.

Anyway I'm going to stop here and start on another letter. If Eayal Teler can so can I. N.B. I don't use Protext.

Dave Harrison,
Milton Keynes,
Bucks.

Milton Keynes eh? Explains a lot. You are rare in your approval of our dropping the disc. But then people only usually write to complain.

Moving up, moving in

I AM going to upgrade to a B2000 and internal hard drive very soon, depending on what your answers to my questions are. I have looked through many magazines and I think I have found where I will get them from.

The 1.3 rev 6 B2000 is being sold by Third Coast Technologies at £999. They say the one being sold by Compost at £799 is imported. If so, will it be a PAL machine? The hard drive I have found is being sold by Club 68000.

It is a 40 meg 24 msec auto boot NEC file card at £479. Do you know if I will need a controller for this or will it be on the card already? Will it be faster than the A590? If you don't know about this drive can you recommend a good internal hard drive for around the same price?

Stuart Bridges,
Bedworth,
Warwickshire.

British laws mean that price fixing is illegal, so anyone can sell an Amiga for whatever price they like. This annoys computer manufacturers, who would rather keep prices the same and allow dealers enough profit to support the machine.

You might be better off buying from a more expensive dealer in case things go wrong.

Commodore cannot stop companies buying machines in one country and selling them in another. It could have a standard worldwide price, but this is far too sensible.

I'm not sure that Compost machines are imported. Even if they were, most Amiga 2000s are made in Germany and you'd be getting pretty much the same deal. Watch out for funny keyboards and a German manual. All European machines are PAL.

The Club 68000 drive gets a transfer rate of up to 500k per second and Paul Share at the Club says it is DMA so at that price it is a pretty good deal. It includes a controller.

The controller with the best reputation is the Microbiotics Hardframe, sold here by Oasis (01-859 4936). It costs £219 and doesn't include the hard drive. With a decent 40 meg unit it will work out a bit dearer. Everything is faster than the A590, which comes as standard with a slow XT drive. OK so you can change it for a SCSI, but what do you do with the old one?

You could wait for the Commodore 2091 but you might go grey in the meantime.

Oh, watch out for revision 6 boards, they have timing problems. The latest release is 6.2, which is fine.

Tale of woe

MY son is doing a BTEC course on computer studies. Just over a year ago we bought him an Amiga A500. The machine expired just after the guarantee. The internal drive broke. That was the beginning of our problems. We have spent a fortune on telephone bills to various companies to obtain a new internal disc drive.

We have spoken to one of the companies advertising in your magazine and asked them whether they do a new internal disc drive. They sent an external disc drive. This we sent back and asked to have our money refunded.

We rang Commodore in Maidenhead and were told that the Amiga A500 was manufactured and produced in Germany. They gave us the telephone number of a company in Birmingham who we were told were the main UK distributors for Commodore spares.

On phoning them, they did not seem to want to know and gave us some telephone numbers in the London area to contact. To date we have had no joy.

We have telephoned numerous places advertising in your magazine, but all they seem to have for sale are external drives. My son requires his computer for when he starts again at college.

If this is a typical example of what buying Commodore is like, never again will we purchase such a machine. Having bought your magazine since we purchased the computer, I would appreciate if you would convey my views on the service we have not received through your magazine.

Perhaps some of your readers could suggest ideas for improvement of such pathetic service as we have received to date from Commodore and the indifference of others concerning just the replacement of a spare part for a computer.

A. V. Brilus,
Cheshunt,
Herts.

Death of a process

I WOULD like to run utility programs from my startup sequence such as clock, but after running the startup sequence CLI's window remains open. How could I return control to the remaining startup sequence commands and loading Workbench and sending CLI output to NIL: while the utility program is running?

Reza Molavi Isfahan,
Shahin, Iran.

The 1.3 version of Run lets you close windows. Put the command run clock into your startup sequence. If you want to keep using 1.2 you need a program called Runback. A popular PD prog it is usually used with Virusx. Not all programs work with this. A good PD library should have a copy.

Hidden power

WHEN my family first bought an Amiga 500 in the last days of 1988 I had already done some research. It was with surprise that when the Amiga was powered up it showed the hand picture and strangely 1.3. I knew that somehow we had stumbled across an Amiga with Kickstart version 1.3, but sadly Workbench version 1.2.

It was only during the summer that Kickstart version 1.3 became ➤

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standard in A500s. Now one year later, and as the guarantee had expired, we decided to clean up the Amiga. It led to us disassembling it to wash the casings.

Guess what was inside? Only four memory chips on the main circuit board (revision 6A), not 16 as shown in the schematics at the back of the manual. A further four sockets are visible. In other words, this is an Amiga that uses one megabit chips, not 256 bit chips, and can have a whole megabyte of chip ram on the main circuit board. And we've had our Amiga for just over a year!

U34 was also replaced with a daughterboard containing two chips and a flying lead. Does this suggest it's a prototype A500? Do I have a Fat Agnus II (is there a test?), and can I make the modification? (We have an A501.)

I would also like to say what an excellent magazine *Amiga Computing* is. It's good that your magazine covers the more serious aspects of the Amiga, not just games.

But why did you stop the cover discs? I guess that some younger people may not be able to afford the magazine at £2.95 or even make use of the disc without a hard disc (all the disc swaps involved) but I could make use of the cover discs and have looked forward to them every month.

Now that I have just sent in my subscription I would've liked the option of having a cover disc each month.

I've never played the games but have marvelled at Jolyon's "law-breaking metal-scraping" demos, with the rest of the cover disc such as Workbench version 1.3.2 going on to my A590. Please bring back the cover disc for those subscribers who want them.

Mouse problems? There are two species of Amiga mice, one made in Hong Kong, the other in Malaysia.

The Hong Kong mouse has calculator-style buttons internally with a push forward door for the ball; the other has microswitches and a circular door for the ball. I should know, we started of with a Hong Kong mouse, now we have a Malaysian species.

John Christopher Lee, London.

A satisfied customer – have him stuffed

EXCELLENT service! And I'm not talking about Boris Becker. Town Computers of Town Road, Hanley, Staffordshire, sold me an A500 last year and I found them to be most helpful and free to offer useful advice.

I later bought a memory expansion and two external disc drives. Unfortunately, when I installed the drives the computer failed to boot.

I returned the machines and drives the next day and had them tested. The fault lay in the drive port on my computer and this had to be returned to Commodore under warranty. When I explained that I was developing software on my machine I was offered the loan of another A500 without any fuss.

The machine was returned promptly and was tested before I collected it. I might also add that I enjoy reading your magazine and found it most useful when I was considering purchase of my A500.

Would it be possible to have a series of articles on elementary machine code and C programming? I find the reader offers department to be of great value also. I find that the reviews are well written and, unlike many magazines, manage to include humour without being silly.

Would it also be possible to include slightly more programs to type in, such as the excellent Model Universe program.

This was the first program that I typed into my Amiga and found it very useful in illustrating the differences between the Amiga and the Commodore 64C that I previously used.

Pete Aikin,
Newcastle-under-Lyme,
Staffordshire.

There are no plans for a C series because by the time you have bought a copy of Manx or Lattice, all the documentation you'll need, and a minimum of two floppies on a 1 meg machine, you have spent a fortune.

Simon feels that not enough readers will benefit from articles which need you to spend nigh on £300 before you get going. If you think he is wrong write to him.

Unclean

I PURCHASED *Amiga Computing* as it stated that it had the new version 1.3.2 Workbench upgrade. After using your script facility to put the new software on to my current Workbench 1.3, I had the following error message when the workbench is loading: Pure bit not set.

Please can you tell me if this is correct, as I appear to be having some difficulty in using other types of software on this new Workbench but that could be because there is a fault on it. Thank you for your help.

R. W. Travell, New Milton, Hampshire.

I don't know. If you don't read the instructions you can't expect it to work. The Readme file explains this – execute the Readme file and all will be tickerty-boo.

Lucky begger

WHAT a really fantastic mag this is. Anyway I'm building up an Amiga system: df1: 512k upgrade and printer, but have hit a snag. Hard drives are expensive, therefore I would be very grateful if you could send me one free (20 megs will do for now) thanks.

Now on to my problem with Workbench. Putting my favourite programs on to a single disc is tough. Not that I don't know what to do, but there just isn't enough room. Crunching and removing unwanted files helps a little but still doesn't solve the problem.

What would be ideal, is if the Workbench could be booted from df0:; and the program icons from df0: and df1: could both be loaded into the one window. Thus letting me load up my favourite programs from the one window without even touching the Shell.

Can you please also recommend a good book to really explore AmigaDos, telling me how much it will cost and where to get it from. Last but not least (who's said that before?) please would you print a few lines on why my A level computing teacher should invest the school's money on an Amiga system.

Look forward to the hard drive, oh yes, and the reply.

Simon Vernon, Leek, Staffs.

Right Oh, the hard drive's in the post. Putting icons in windows when they refer to different devices is a very strange thing to do, and I can't see anyone ever being stupid enough to write one.

Your school should get Amigas because when you go out to the big, bad world you'll have to contend with lots of different computers. Only the Amiga 2000 is compatible with the BBC, Amiga 500, IBM PC and Mac.

Soon it will run Unix which will be a very important operating system. As a graphics tool it is the most cost effective machine you can buy, and if your teacher is into music it has greater abilities than anything at a similar price.

I hope that answers your questions. By the way, I lied about the hard disc.

Broken chips

FINDING Workbench 1.2 software unusable due to constant gurus when doing anything with a window, I bought the 1.3 software.

It is an improvement, but if I get cocky with windows, opening two or three and changing their shape the guru visits me.

It is impossible to program windows with Basic, so all menus have to be simple screens. I also have a problem with games. Race games (Chase HQ and GPS) fall over regularly but I have never had a problem with F16. I suspect the 1.3 chip, maybe a particular function linked with race game scrolls, or windows is dodgy on the chip.

Therefore replacement seems a viable route. However being a spineless programmer, I wouldn't like to touch hardware until my theories are proven.

I hope that someone who has had the same problem but is now cured may write to this grand magazine and relieve some frustrated racing drivers.

I am reluctant to send my machine off to a repair centre as you often hear of machines returning without the symptoms being eased.

I consider it must be impossible to pinpoint a singular minute error in something as complex as a chip, and I don't think their experts sit around all day playing Chase HQ waiting for the machine to fall

➤

over. As with most everything these days, replacement is the key, and if I can find what to replace then it can be sent off.

Martin Kitwood,
Lincoln.

Nah, when I worked in a computer shop we didn't spend all day playing Chase HQ. We played Snapper, but then it was a BBC shop a long time ago.

Your Amiga is sick. More sick than just a new 1.3. It needs one of the big chips changing, one with loadsa pins. Take it back to Dixons and say: "This Amiga is not of merchantable quality. Ezra Surf told me to ask for a new one".

Sold to the man in the hat

I HAVE a few problems to sort, so please take a year or two off work to solve them. First of all, best magazine around, down to earth and humorous. I would like to know of any books there are in which I could find out how to write my own comms programs.

I am just out of the army and I am looking towards a career in computer programming, please help (I am 18).

I have had my Amiga 500 for about a year but I haven't really got using it until the weeks before Christmas, and it totally amazes me.

But as I have mentioned before I am interested in communications with my computer so all advice will be heeded and gratefully appreciated..

Here in Northern Ireland we are way behind where Amiga, software, hardware and advice is concerned. Help me ObiWan, you are my only hope.

Russell Willis,
Newtownards,
Co Down.

The Model Shop in the centre of Belfast may not be the place to be seen, being totally uncool, but it has a good stock of books. There is a computer shop in Woolco down the road from you but they only sell games. Have a look at some of the public domain comms programs which come with source code. Argo Term or FF12 is a good place to start because it is simple.

Machine code oldie

LAST Friday I discovered your magazine. On 8 bit machines all my own programming for the last seven or eight years has been in assembler, and I'd prefer to do that with the Amiga.

I started programming 20 years ago by cutting cards for Fortran for IBM, ICL and Honeywell mainframes, and I have taught Basic for the Beeb to social science students.

But I want to use assembler. The snag, finding the information. I have Devpac, which is good, I have one book on machine code but it uses quite a different assembler. I've ordered the Rom Kernel Manual – includes and autodocs. I've ordered the MC68000 book, still waiting for them.

The intuition manual is deleted, out of print, most books I look at in bookshops spend about three-quarters of the text on intro to Basic, or intro to C.

I can program in C, but prefer assembler, and anyway the price of a good C package is beyond me at the moment.

So please nail Jolyon down and ask him what books make up the best library for a dedicated assembler programmer, and tell him I'm looking forward to his next article.

Stan Lenton,
Leominster,
Herefordshire

Nailing Jolyon down is what a lot of people want to do. He's working on a game right now and so won't have time to do too many articles.

Recommended books are the Amiga Hardware Reference Guide from Addison Wesley and Systems Programmers Guide from Abacus, although you probably won't need both.

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What a BLAST!

Audiophile John Kennedy tries to make himself heard above the noise of his new toy

WE Amiga owners have always been smugly aware that the sound output from our computer comfortably outclasses any competition. Those with suitable hi-fi systems are duty bound to connect up and listen goggle- eared to the intro tunes of games. Or, better still, the superb public domain music available.

For those without suitable sound resources the alternatives are listening to the tinny and sometimes mono sound from a monitor or television set.

A more sensible approach would be to buy a custom-designed sound amplifier to provide the screams of despatched aliens in full stereo. And, good heavens, if I don't have such a device sitting on my desk at this very moment, the Sound Blaster from Siren Software.

The amplifier is a small cream coloured box that sits neatly on top of an A500. It connects to the Amiga's speaker outputs, taking power from the small 12 volt transformer supplied. The sound is rated at 5 watts per channel which, when used at top whack, is extremely loud. Enough to drown out speech in a busy magazine office, for example.

Pardon? What was that, Green? Oh, I said: *Loud enough to drown out speech in a magazine office!*

The only controls on the unit are the two oversized volume knobs, one for each stereo channel. This neatly side-steps the need for a balance control, the only drawback being that if you need silence in a hurry – say to answer the telephone – you have to twiddle two knobs instead of one. The speakers are of excellent quality. They are three-way (woofer, mid-range and tweeter) car speakers rated at 50 watts a-piece.

Small enough to sit on your desk, they provide a good stereo image with only marginal distortion at the highest volume settings; I connected them to a portable CD player and they gave better results than the originals. A very acceptable two-and-a-half metres of cable is provided, enabling the speakers to be placed where they will give best results.

DOCUMENTATION, however, is disappointing. After all the trouble spent on getting the unit to look pretty, a hurried A4 instruction sheet is a serious letdown. Maybe the piece of paper I got isn't the finished version, because it labelled the power supply socket incorrectly. Thankfully, the unit itself has all the connections clearly marked.

As an added bonus, and "for a limited period only folks", Siren is supplying a pair of free stereo headphones. These are bog standard units and connect to the spare socket on the amplifier. If you want to listen in private you must remember to unplug the main loudspeakers, because they do not cut out automatically.

If I had to criticise the Sound Blaster, then I would say that it should have had different types of socket to connect the speakers and the power supply, avoiding completely the danger of sending 12 volts up the wrong hole.

But with an amplifier the sound quality is of paramount importance, everything else takes second place. Sound Blaster is loud and, although not quite up to System A standards, it is of high fidelity.

You owe it to your Amiga to hear it through a decent set of speakers. When you do, make sure you let the ST owner down the street know all about it.

REPORT CARD

Sound Blaster
Siren Software 061-228 1831
£44.99 + £2 p&p

EASE OF USE...
Possible confusion with the sockets loses it a few marks.

VALUE ....
The speakers alone must cost this.

PERFORMANCE
Loud, clear sounds.

OVERALL ***78%***

Amiga Arcade

Competition winners

WE need to bring you up to date on a few competition winners: Wayne Gretzky's hockey outfit was won by **David Fairweather** of Middlesborough; the lucky person who will be flying with DI is **Ken Holland** of Wareham in Dorset; and driving in the Fast Lane will be **Ian Timson** of Clitheroe, Lancs.

Well done all of you, we hope you enjoy your prizes.

Good old Green

THANKS to the vigilance of *Amiga Computing's* Nik "Green" Veitch, games players have been saved from a nasty dose of The Pentagon Circle Virus which was on the review copy of Leisure Genius's Risk.

Quick as a flash he conquered South East Asia while Jeff called Lesley Walker at Virgin to warn her of the danger. Fortunately only 20 infected copies got out, so the copy of Risk you buy in the shops (and you should – it's jolly good) will be virus free.

Perhaps the real praise should go to cunning Canadian Steve Tibbett; it was our mate's program, VirusX 4.0, which spotted the infection.

Bitmaps breed for Speedball sequel

THERE is a kind of magic which the Bitmap Brothers conjure up when they code a creation. Xenon, Speedball and even Xenon II which was written for the Bitmaps by The Assembly Line show the polished programming and silver surfaces which are the Brothers hallmark.

Even programming geniuses are only born with one pair of hands, so to satisfy the Amiga world's hunger for Bitmap Brothers' programs they have hired some help. Dan "Antirad" Malone, Rob "Driller" Chapman, Steve "Beverly Hills Cop" Tall and the artificially intelligent Rob Trevellyan.

The enhanced team will produce Speedball II, a sequel to the hugely successful futuristic sports game.

Steve Tall is working on a secret project and the original lads are working hard to polish Cadaver, an isometric 3D game which will kill the BM's reputation for producing games which all look the same.



The Bitmap Brothers – spot the cadaver

League winners

COMPETITION for the best footie game is hotting up. The newest and flashiest contender is Emlyn Hughes International Soccer from Audiogenic. The playability is claimed to be unsurpassed with action at 50 frames a second and digitised sound so good you you might as well be at a match.

Budding Selina Scotts will enjoy the Team Editor which has a fashion design option. Tailor the cut and patterns of the strip.

Full league and championship games can be played. The opposing teams exhibit artificial intelligence (so it isn't quite like the real thing).

Played on a full PAL pitch it is the result of Graham Blighe working on different versions for a couple of years concentrating on the games programming and AI.

Terry Wiley has worked on the front end, while the graphics are by Andrew Calver. A spokesman for the company said: "It's in a different league", but then you have to expect that sort of thing from Gary.



It's not Princess Anne, is it?

All the latest news on the games software scene

Pricey parrots

SOMEWHERE deep in the heart of the Amazonian jungle there beats a drum. Softly at first, and then louder, the insistent beating awakens our hero, Kid, from a deep, drug-like sleep. He wakes slowly, with difficulty (a bit like Green) confused and uncertain (a lot like Green). The last thing he can remember is pulling on an old pair of boxing gloves that he found in his uncle's attic.

And now here he is surrounded by trees and shrieking parrots. There's something odd going on here.

No there isn't, it's just Kid Gloves, a platform game from Logotron set against scenes of the Ice Age, rain forests, the Industrial Revolution, the pyramids of (oh no not again!) Egypt and the psychedelic West Coast of the Swinging Sixties.

In the shops now at £24.99, which seems a bit pricey for a Bombjack-cum-Rick Dangerous rip-off.



Kid Gloves – ladders and platforms from Logotron

Hand in hand

FOR the first time ever the development of an arcade machine and its home computer conversion is progressing in parallel.

Klax, the Atari coin-op, was unveiled at the amusement trade exhibition at Olympia, but won't be shipped into the arcades until mid-April to coincide with the all-format release of the Tengen computer version.

Based on a very simple concept, Klax has you catching coloured tiles as they roll down the screen and flipping them into bins below. The aim is to arrange the tiles in lines of three of the same colour.

It sounds easy, and it is, until the tiles start rolling down faster than you can catch them.

Check it out. Sounds like it could be the next Tetris.



REVIEWED THIS MONTH

- 95% Pipemania
- 91% Austerlitz
- 90% X-Out
- 89% Hound of Shadow
- 86% Starflight
- 86% Super Cars
- 81% Dr Plummets House of Flux
- 80% Untouchables
- 78% Operation Tunderbolt
- 71% Demons Tomb
- 69% Vortex
- 67% Gold of the Americas
- 65% Fifth Gear
- 65% Kick Off Extra Time
- 52% Space Ace

MAX HACKS

- **Weird Dreams**
- **Space Ace**
- **Arkanoid II**
- **IK+**

Gallup Chart

		Last Month
1	Chase HQ Ocean £24.99	2
2	Op. Thunderbolt Ocean £19.99	8
3	Hard Drivin' Domark £19.99	3
4	Ghostbusters II Activision £24.99	10
5	Extra Time Anco £9.99	NE
6	Shadow of the Beast Psygnosis £34.95	6
7	Batman – The movie Ocean £24.95	1
8	Double Dragon 2 Virgin Mastertronic £24.95	NE
9	Kick Off Anco £19.99	RE
10	Space Ace Readysoft £49.99	NE

PIPE MANIA

Go with the flow



Gaps let you loop off the edge of the screen

HOW long do you think the experts at *Amiga Computing* spend reviewing a game? A day? A week? Well here is a program which has been under test for a year. That's how long it is since I first saw a game which was then called Pipeline. And it is as fresh today as it was in the spring of '89.

When you have a game with a zillion evil aliens or a film star in the title role it is easy to understand how it can be enthralling. Abstract games are harder to understand, but often just as much fun.

Pipe Mania has a shade more plot than Tetris, and a tad less than Bombuzal, but it rates alongside those two as one you can't put down. A real "It's three in the morning so I'll just have one more game" jobbie.

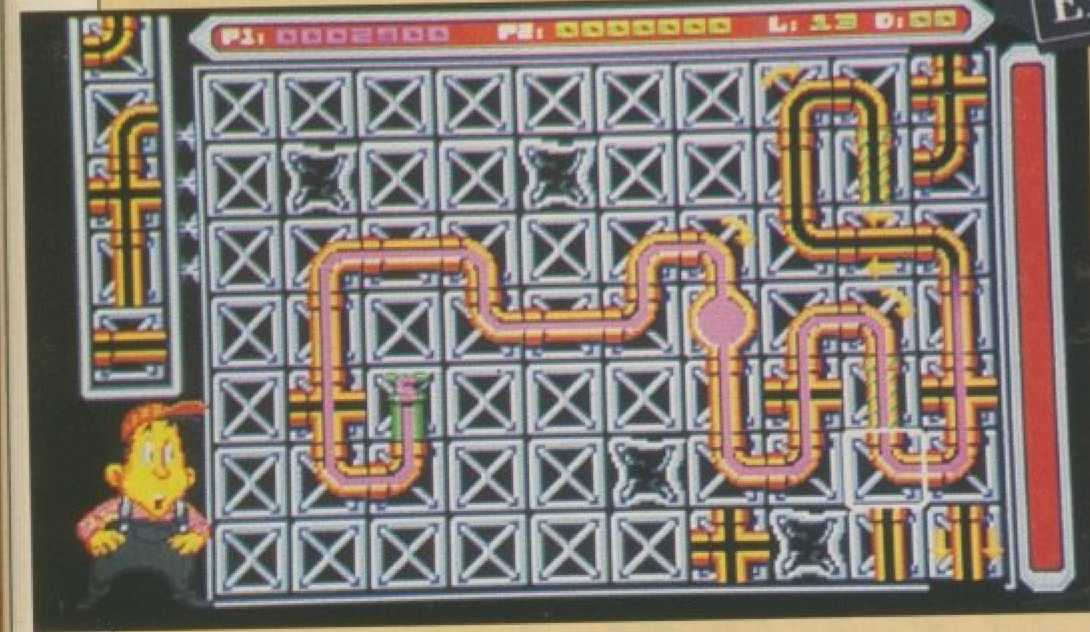
The pipe has got to be built, presumably because that is what you do with pipes. For every extra bit you add on you score more points.

Sections are added against time, they come off one – easy mode – or two – experts only – stacks. In a two player game each player has one of these, but when playing solo you can choose which stack to use.

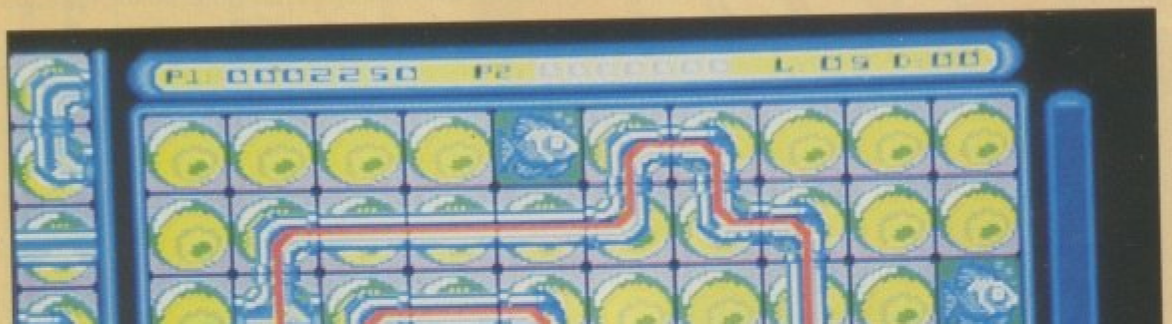
You can see five shapes ahead in each stack. This allows you to build in an unconnected area and then join the sections up later.

Playing two player is vicious, you need to absorb so much information — where the pipe is, what your shapes are and most importantly what your opponent is planning.

When the time limit expires all pipes must be connected, but if you use a cross-shaped tube the



The bulging reservoir slows the flow



Holy Zarquon, singing fish, I'm on for a high score



Striped pipes give bonuses



side pipes do not need to be linked. A liquid then runs down the pipe and you are awarded points for each section filled. As the liquid runs along you can add bits of pipe, but eventually you'll fill the screen or the gunge will catch up with you.

To help you there are reservoirs which slow down the flow. Make sure an early bit of pipe goes to one of them.

You must fill a minimum number of elements to progress to the next level. Any segments of unused pipe on the screen are destroyed at a cost of 100 points. This can be especially annoying when you have built a long loop and missed out one section which renders connected pieces redundant.

As you progress through the levels there are more hazards and bonuses to be found. There are funny fish-shaped blocks which get in the way of your path-building, pipes which give you a bonus score, and end pipes. These are really taxing because the stacks will appear to conspire against you, forcing the pipe away from the end.

The graphics have been spruced up considerably in the past year. In most respects this is an improvement, however sometimes arrows which show the direction of flow in one-way pipes are a bit difficult to see.

The sound is similarly lukewarm, the left-over pieces exploding at the end sound a lot like Michael Barrymore's "awright", and the simple tune is a let-down on the Amiga.

Still it is the gameplay which matters and which shines. This is a case of a game where the score doesn't tell the whole truth, I've played it nearly every day for the past year. Nothing else comes close in addictiveness.

Simon Rockman

Pipe Mania
£19.99
Empire

Sound

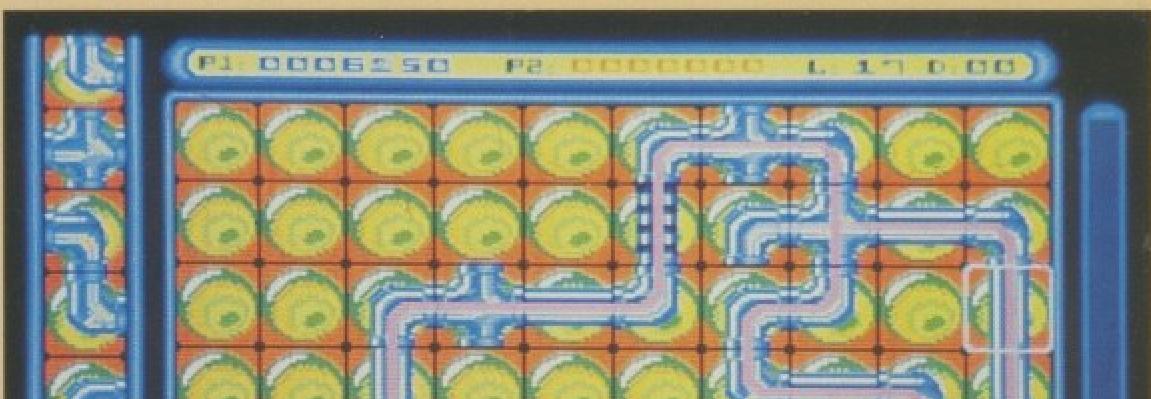
Graphics

Gameplay

Value

Overall – 95%





Loops give higher scores

Excellence

AUSTERLITZ

War without tears



Napoleon: An army marches on its stomach

NAPOLEON is regarded as one of history's greatest generals alongside the likes of Lee, Patton, Rommel and Julius Ceasar. He was certainly the greatest of his period, as is demonstrated from his rise from the Corsican middle-class to the throne of an empire which at times included the best part of Europe.

It was his skill as a politician as much as anything which reserved him a place in history. He was the darling of the French people and the army. On his way back from exile in Elba the royalist armies sent out to capture him refused to harm their Emperor and ended up joining his ranks. As Wellington said shortly before Waterloo, "His hat on the field is worth 50,000 men."

His superb multi-tasking brain (he was known to dictate upwards of three letters simultaneously) made him a fearsome opponent even when outnumbered, as was the case at Austerlitz.

Although the Russians were taken somewhat by surprise to find that the army they had come to relieve no longer existed, they still had superior numbers and a better position on the Pratzen Heights, three miles west of Austerlitz.

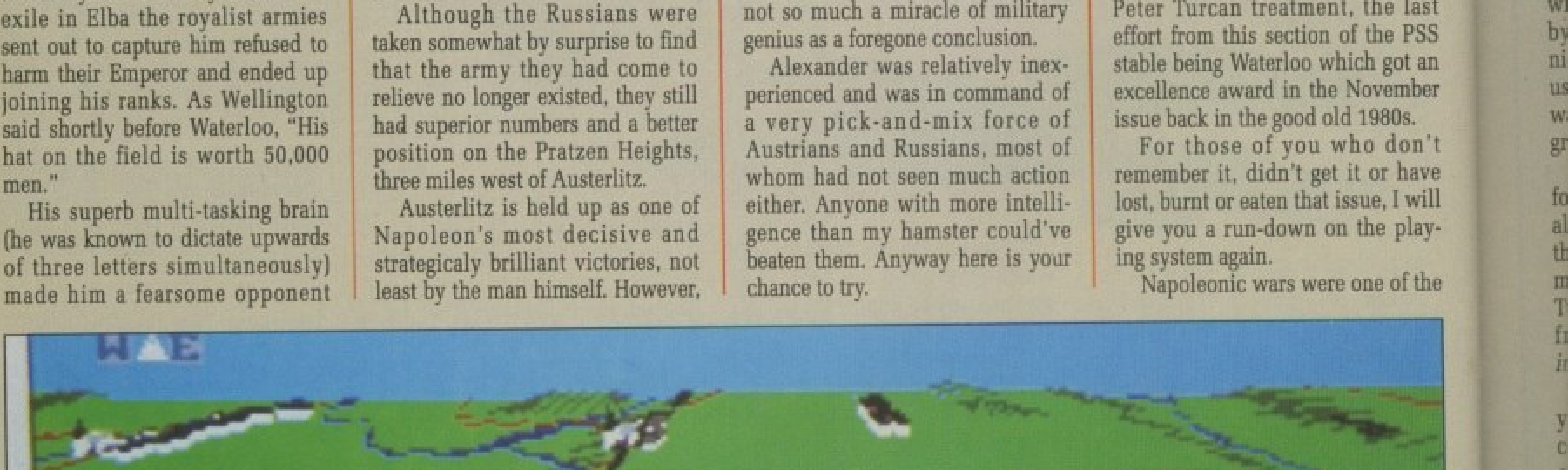
Austerlitz is held up as one of Napoleon's most decisive and strategicaly brilliant victories, not least by the man himself. However, given the facts which have emerged since the battle, it seems not so much a miracle of military genius as a foregone conclusion.

Alexander was relatively inexperienced and was in command of a very pick-and-mix force of Austrians and Russians, most of whom had not seen much action either. Anyone with more intelligence than my hamster could've beaten them. Anyway here is your chance to try.

Austerlitz is the latest Napoleonic battle to receive the Peter Turcan treatment, the last effort from this section of the PSS stable being Waterloo which got an excellence award in the November issue back in the good old 1980s.

For those of you who don't remember it, didn't get it or have lost, burnt or eaten that issue, I will give you a run-down on the playing system again.

Napoleonic wars were one of the



The next greatest misfortune to losing a battle is to gain such a victory as this



I never saw so many shocking bad hats in my life

most interesting periods of warfare. Large armies were not uncommon when the world was still gripped by the imperial fever. The techniques involved had to encompass use of both fairly ancient modes of war such as lancers and more progressive technology like muskets.

This not only made it difficult for the generals of the period, but also for anyone trying to simulate the strategies involved. Among the more interesting details that Dr Turcan takes into account are the fragile chain of command and *intelligent* corps commanders.

This means that not only might your orders not get to the specified corps but when they arrive – which can take several hours – the local commander may decide he has special knowledge of which you are not aware and simply bin them.

All the offensive and defensive plays of the time are supported, with individual units adopting line column and square formations to suit the situation. The morale of the combatants is also very important.

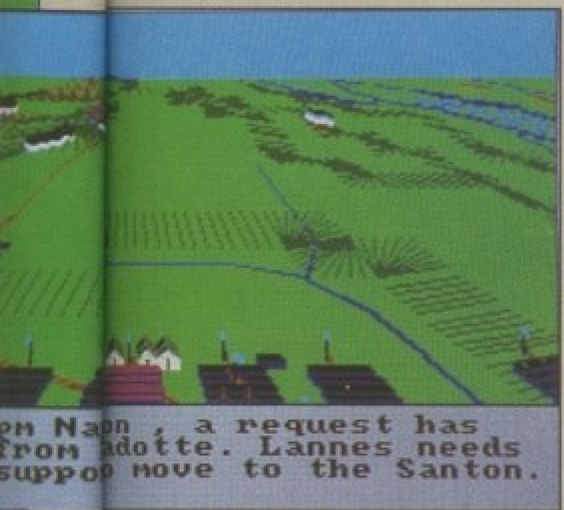
Orders are issued in plain English using a system which actually makes sense and adds to the realistic feeling of the simulation. I say simulation because this is not just a wargame, but a highly accurate account of a historical situation. The attention to detail is superb.

The graphics are wonderful but they're not just gloss, you need to look around to find out what's going on – there is no overhead map depicting units.

The day is broken up into units of 15 minutes, perhaps because this is a nice manageable unit in terms of movements and overall gametime, but perhaps also because Napoleon once said "A battle may be won or lost in a quarter of an hour."

To my knowledge this series is the only worthwhile simulation of Napoleonic warfare and I only hope it will continue.

Lucinda Orr



Napoleon: There is only one step from the sublime to the ridiculous

Austerlitz
£24.99
PSS

Realism
Strategy
Gameplay
Value

Overall – 91%

FIFTH GEAR

Driving you mad



AN illegal race, a fast car and lots of weapons. Sounds like fun? If you answered yes, then apart from saying a lot about your state of mind, you'll be interested in Hewson's latest contribution to road safety.

The game concentrates on making control of the car the main challenge, something which will have the less patient throwing down joysticks in frustration.

The view is from above and slightly behind, so if you are careful you can drive behind the various objects scattered around.

If you persevere visit the local QuickFit for extra fuel, guns and ubiquitous extra weapons. More enemy cars and helicopters turn up to be shot at.

I can't help feeling that if there was an established range of budget games for the Amiga, this would be one of them. At the asking price, Fifth Gear gets tedious.

John Kennedy

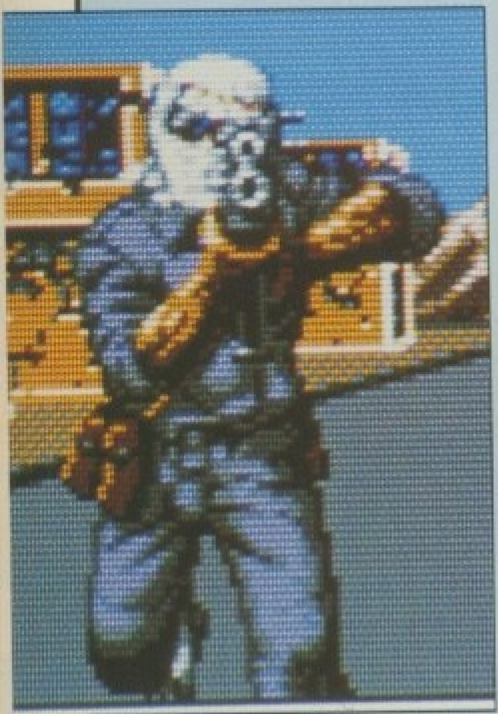
Fifth Gear *£19.99*

Realism
Strategy
Gameplay
Value

Overall – 65%

OPERATION THUNDERBOLT

If it moves, shoot it. If it doesn't move, shoot it anyway



I'll teach you to criticise the ST



Watch out – he's using cutlery

KIDNAPPING arabs have boarded an airliner, forced it to land in hostile territory and taken hostages. What, again? Well I don't care – it keeps me in work. I'm hard, see? I wear combat gear and cover my face is black make-up. And I've got a machine gun.

It's my job to solve problems like this without any of that sissy negotiation stuff. Just get in there and machine gun everything that moves.

If one or two hostages get burned, well that's their problem. They shouldn't have been flying with arab airlines in the first place.

First I have to make contact with Intelligence. Intelligence is not something I have had much contact with, but I'm sure I'll recognise it when I see it. Unless I shoot it first, hur hur.

Hey, here's a cat. Get out of the way, cat. Oops. Stupid cat. I shot it. It shouldn't have been on an arab street in the first place.

The arabs are throwing all they've got at me. Guns, knives, hand grenades, even tanks and helicopters. You name it. In fact everything that the commies used the last time I went on a mission, the code name Wolf operation.

This time I have a laser-sighted machine gun, as long as I get the equipment and ammunition floating down on the parachutes that is.

Plus I got a buddy with me this time. Walking down the street beside me, just as keen to clean up this gutter town as I am. Those dirty stinking arab commies don't have a chance.

What's this? A dog now. Get out of the way.. Oops. Stupid dog. It shouldn't have been on an arab street in the first place. It seems to have left some ammo for me as well. Never mind. It was probably brain washed.

Riding on the jeep makes a change. So do the attacking jet aircraft. They're really taking this attack personal, aren't they?

Hey! What's this! They've shot my mate! Those darn pinko subversives! I'll get you all!

Right, I'm in the plane now, and the last kidnapper is hiding behind the pilot. There is a good chance that I'll hit him as well. Oh what the heck.. I've always wanted to learn to fly..

The graphics in Operation Thunderbolt could not really be bettered in this type of game, with the possible exception of the slightly less than impressive 3D scrolling.

The large enemy sprites jump out from all directions, blazing away with their guns quickly and lobbing all sorts of nasty things towards you.

Playing with a mouse means you'll need to pick up a laser sight to get anywhere, as without it you can only tell where you are aiming by the impact the bullets make. Not a good technique with limited ammo. With the sight, a small coloured dot appears over whatever you are about to blow away.

The joystick option comes with the sight as standard, perhaps to make up for the impossible lack of speed. Another game where a clean mouse mat is a must.

Sound effects consist of good quality speech samples telling you the obvious, and budabudabuda-type machine gun sounds. The arabs make a slight moan as you shoot them. All very tastefully done.

I have being trying very hard to avoid criticising this game on moral grounds, but I can't contain myself any longer. It just seems strange to me that writing a game about machine-gunning Libyans is seen as perfectly OK and normal.

Imagine the same game, moved to a small town in the south of England. Say also, for the sake of argument, that the name of the town was Hungerford. It's not funny any more, is it? The sad thing is that this game will sell well.

John Kennedy



Extra weapons, just what I need

Operation Thunderbolt
£24.99
Ocean

Sound
Graphics
Gameplay
Value

Overall – 78%

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THE UNTOUCHABLES

Not much gets close enough

The Untouchables
£24.95
Ocean

Sound	
Graphics	
Gameplay	
Value	

Overall – 80%

IF you think this is a game about the antiquated caste system in India then you have obviously been spending too much time in the arcades and not enough in the cinema. How anyone could miss the chance of seeing Sean Connery, probably the greatest actor to tread a board since Larry, is completely beyond my comprehension.

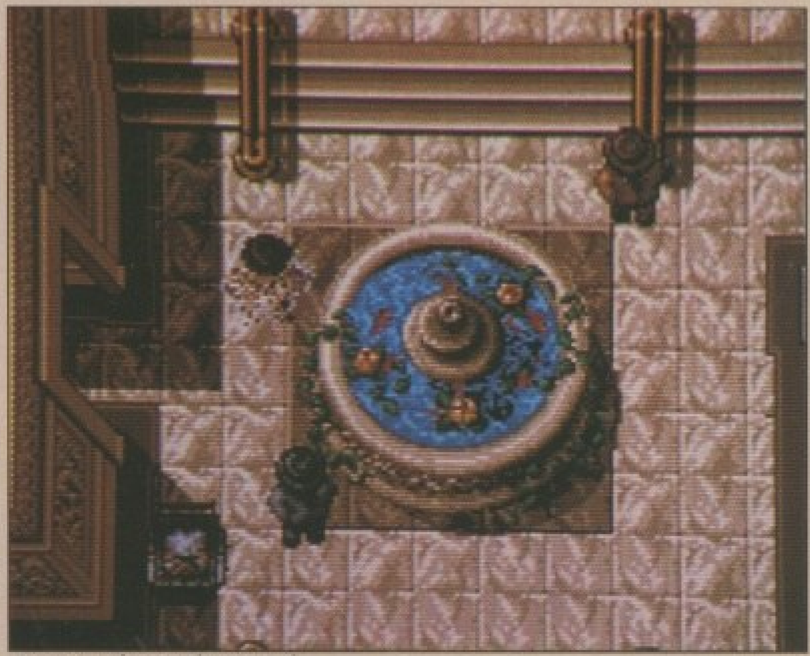
The game follows the plot of the film quite faithfully and is divided into six parts spread over two discs. The first of these levels has you as Elliot Ness poking around a warehouse looking for documented evidence to use against the felons.

Ness must shoot approximately half the population of Chicago before collecting enough pieces of paper. The interesting thing is that those who like to wade knee-deep in gore will not fare as well as the quick in and out artist. Hanging around to shoot at people only encourages more bad guys to join the fray.

Evidence collected, Ness now finds himself as sole agent trying to stop a consignment of bootleg alcohol. It can be confiscated by shooting the bottles, but watch out for the swelling ranks of henchmen who want to do some henching.

This easily ranks as the most forgettable part of the game, closely followed by the next section.

In order to protect a star witness the Untouchables must rapidly make their way to the station. Instead of hailing a cab and inviting the driver to make all haste they decide to take a short-cut through the backstreets. This turns out to be not such a hot idea, as all makes and models of hoodlum pop up out of the masonry in an attempt to get to grips with the law.



Drama on the courthouse roof

Members of your gang load up the pump-action and pop round the corner of the alley to blast off a couple of rounds, but when at last the work is done don't turn round, because you've got to keep moving – time is, as they say, of the essence.

At last you reach the station, and it was well worth it. The graphics in this part of the game are wonderful. The animation isn't anything terrific and neither are the sprites, but the background is incredibly well done.

A catastrophe has happened. A little sprog in his pram has accidentally started rolling down the steps and only our hero can save him, while simultaneously introducing the concept of annihilation to the several thousand bad guys who have also turned up on the scene.

It is vitally important to stop the sprog from spilling his brains, so you'll have to nudge the pram past obstacles and passers-by until it reaches the bottom.

Actually the pram is quite a handy weapon – although it is easily overturned by Mr Average with no difficulty whatsoever if it runs across someone with a less than saintly background it will vapourise him. Obviously some sort of occult power.

Level five is pretty short. The witness has been taken hostage by one of the bad guys. You have just one bullet to make him see reason. If you miss it's mop and bucket time for Mr Witness.

Finally chase the henchman across the roof of the court building. Duck into cover to reload and shoot pot plants for extra energy (don't ask me, I'm only the reviewer). If you are successful he will eventually get fed up and throw himself over the edge or something like that. And then you've done it – what a hero.

While the name may be untouchable the game certainly isn't. The graphics aren't excellent, the sound isn't terrific, but saving it from scorn and ridicule is the gameplay – it's very playable.

Other software houses should take note – this is how to do a film tie-in properly.

Green



Didn't mother warn you about dark alleys?



Down in the station

DR PLUMMET'S HOUSE OF FLUX

Into the valley of weirdness

OK, so you've seen it all before, it's just another Thrust-Raiders-Oids clone, yeah,yeah. Next program please. Oh good, lots of blood and violence, now this is what games are all about..

But hold on a minute, because if you pass Dr Plummet's House of Flux by, you'll be missing out on something. Not missing out on some state of the art programming. Not missing out on originality, or wonderful effects.

You'd miss out on a neat sense of humour, something which is getting hard to find these days, and mostly coming from across the Atlantic. Remember, if it makes me start a paragraph with "but" then it is something worth looking at.

The Dr Plummet of the title is odd. Very odd, the archetypal mad scientist kind of odd. A real Pink Floyd fan. With flares, far out psychodelic ties and purple jackets. The Assistant Editor look.

So, Dr Plummet, bored with mankind (and alien-kind for that matter) has set himself up on a custom-built planet to hide away with his ultimate weapon, designed the previous week. Obviously both the aliens and the humans are after this weapon, hell bent on death and devastation.

And you? Well, you know better. You aren't a breadhead into destruction and heavy things like that. You're a good guy, and you're going to rescue the good doctor. Or at least have a try.

Your ship is of the small, rotatable, thrustable type with blasters and standard issue weapon deflection shields. Ideally suited to exploring outer space and strange planets, or at least, planets which obey the normal physical rules.

Dr Plummet was never one for rules, so his idea of gravity and Newton's concept tend to differ in places. Somewhat dramatically at times. Like, opposite even. Or at the very least, very odd.

In several scenarios it is more like flying a stunt kite than a spaceship, swooping and diving in circles to rescue the astronauts.

Didn't I mention the astronauts? There are six to be rescued before you move on to the next scenario, each weirder than the one before.

They are grouped into four sections of seven, allowing you to choose your starting place. They range from seemingly un-weird planets to zones with seriously hypnotic backgrounds.

My favourite was a land of the giants, based in a laboratory. It was great fun reliving A level organic chemistry from the point of view of a benzene molecule.

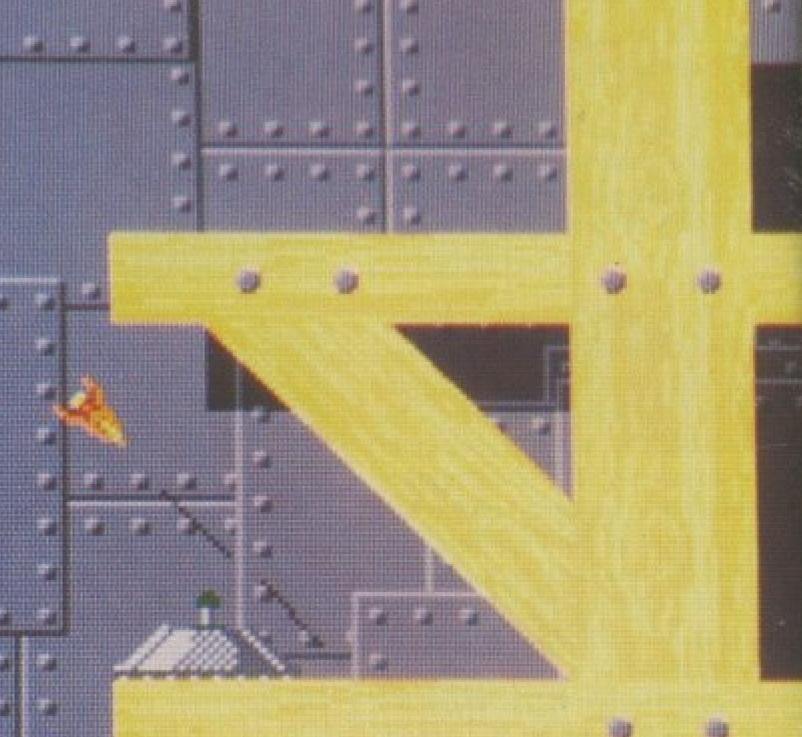
This is the kind of game I really like. Written more as a hobby than a professional product. More for fun than fame. Flying in the face of "real" Amiga programmers everywhere, it even obeys some (but not all) operating system rules, so I managed to install it on to my hard disc.

This almost makes up for the bog-standard font used to display scores. Looks bad, guys. Ruins the karma. A bit of parallax scrolling would have been mind expanding too. But hey, I'm mellow and won't complain too much.

With the game you get some nice props to make you feel better about spending your money, and quite right too. Opening a huge box to nothing more than a folder A4 sheet of instructions and a disc is very depressing. Dr Plummet has enclosed some alien currency and a letter from a chum for you to read. It all adds to the game, lifting it above the ordinary.

It's fun. Get it.

John Kennedy



Blow up the gun, but avoid the scaffolding

Dr Plummet's House of Flux
£24.95
Microillusions

Sound

Graphics

Gameplay

Value

Overall – 81%



The miracle of chemistry; that astronaut will get into this spaceship

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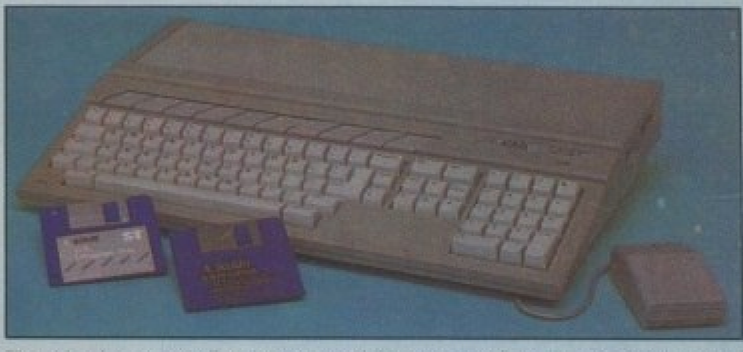


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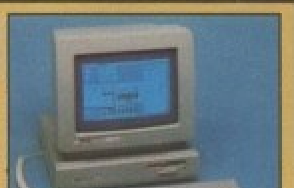
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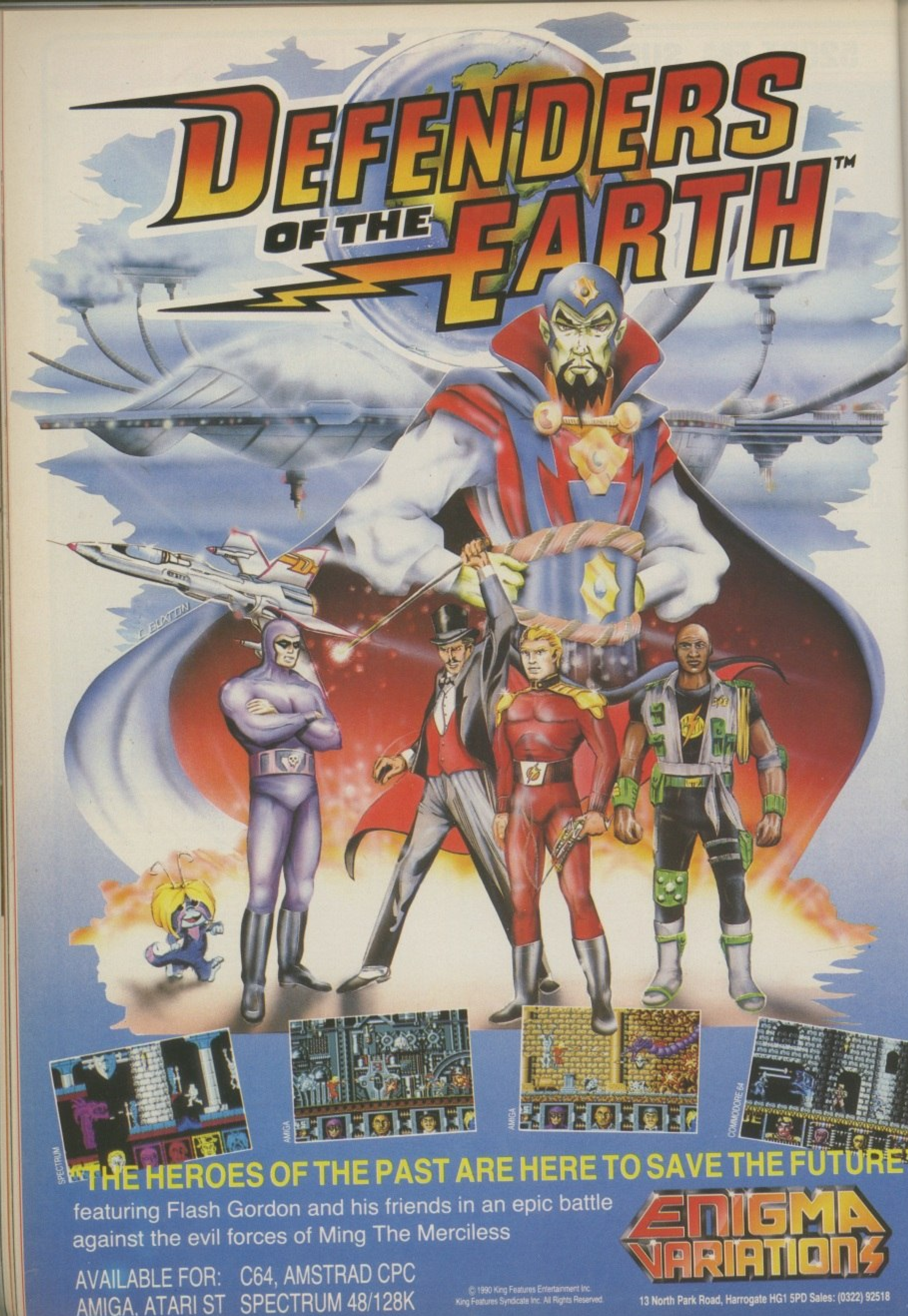
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SPACE ACE

Cartoon-type caper

BRILLIANT! Well, it looks brilliant. It sounds brilliant. It comes on four discs and it costs lots of money, therefore it must be brilliant. Musn't it?

The evil commander Borf has hit upon a novel way to enslave Earth by means of the fiendish Infanto ray which changes everyone into children. A freak reflection must have hit our office.

Earth's greatest hero, going by the snappy name of Ace, has become involved because not only has he been knobbled by the Infanto ray, but his girlfriend has been kidnapped. Ever had one of those days?

The game is made of about 40 short scenes, each lasting for several seconds. At various points during a scene our hero will meet a nasty fate unless you correctly judge his reactions.

For example, at one point a large robot is mashing up the ground and to pass you must go left, wait a bit, then move left again. If you get it wrong three times , you die, and back to the start you go. Eventually you learn what to do in each scene – by a process of elimination if necessary.

It's not easy of course. Each scene will take a good number of attempts to get right, and although there is a save game option, it is quicker to play through the entire sequence again.

The games runs in 512k, but support an extra disc drive. This halves the irritation which being able to install it on a hard drive would have eliminated.

The reason for this style of gameplay is that the game has been converted from the laser disc version, which used a system of separate animations stored on a laser disc and displayed when needed.

The Space Ace arcade game – the sequel to Dragon's Lair – looked amazing, but it cost a fortune to buy and kept breaking down.

The number of discs in the Amiga package certainly seems impressive. However, once you get it right, the contents of the first disc can be played through in the space of one minute.

At more than £10 a disc the value for money quotient might seem rather low, but it is easy to see why it costs so much. The time and effort spent on the graphics must have been phenomenal, and both cost.

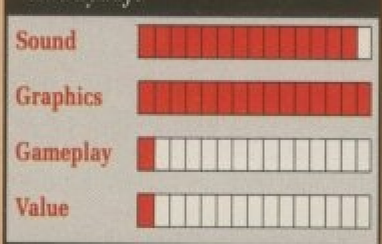
The animations are based, more than based – copied – from the laser disc arcade version. The creation of ex-Disney artist Don Bluth, they look stunning; fast moving, colourful and detailed. The sound track has also been digitised from the arcade game to good effect.

Space Ace is the closest you could imagine to playing in a cartoon. It is real, interactive TV. Unfortunately, the gameplay is nothing more than a memory test, rather like the old Simon computer games.

Admittedly if you see Space Ace playing in a shop, you'll probably want to buy it straight away. Think very carefully before you do.

John Kennedy

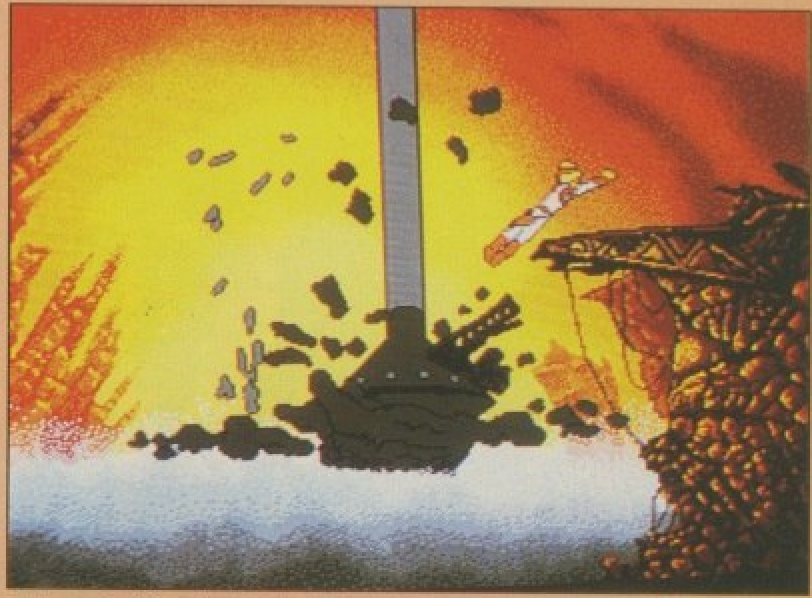
Space Ace
£44.95
Readysoft



Overall – 52%



"Don't try to out-weird me three-eyes"



A step to the left, a jump to the right



Weight watchers made easy

DEMON'S TOMB

Strange goings on in the Devonshire countryside

LYNTON stands in front of the inscriptions, scribbling in his notebook. His shadow moves wildly on the wall in front of him, cast by a flickering oil lamp. Working feverishly, he is totally oblivious to the horrible fate that will befall him before the end of the third paragraph.

Suddenly a strange wind slams the door to the burial tomb shut, and Lynton is trapped. But worse, as he turns, his lamp falls to the floor and shatters, spreading burning oil which ignites the dried leaves and timber scattered on the floor. The tomb fills with smoke, and Lynton realises that he has only seconds to live before it becomes his tomb too...



I knew I should have got a smoke detector

...which is when you take over. With your last few breaths, you must try to preserve as much information as possible. The more you can save, the more help you will have been to those who will come to investigate your absence.

You have only a short time before you are overcome with the heat and smoke, so full use must be made of the small number of moves available. Whatever you do, you cannot thwart the prophesy of the opening paragraph; Lynton dies.

This "prologue" is a game in its own right, and finishing it will provide vital clues. It is an original start to a game – a miniature and exciting adventure before the main challenge begins.

Once this prologue is ended – by the unavoidable and uncomfortable death of the good professor – you begin the adventure proper, playing the son Richard as he tries to solve the mystery of his father's death.

One of the first locations you'll visit is the tomb, and if the prologue was played correctly there will be some clues waiting to be carefully examined. The major one is a notebook, complete with suitably vague scribblings. These notes point to a unusual astral arrangements, which when combined with strange happening in the locality, all point to some rather dark deeds afoot.

To add to the general weirdness, the adventure starts on Sunday, March 20, 1990 – which is particularly odd because my diary shows March 20 as a Tuesday.

The program provides a traditional text only system, and a menu based one for the terminally lazy. The text parser is a pleasure to use, and it is definitely a shame to play with only the menu system and so miss out on it.

Text can be edited, and a history of the last few moves is kept in memory. Typing mistookes can corrected easily. If you type "go mouth" all you have to do is hit arrow up and replace the m with an s. Almost as much fun as AmigaDos.

You can also define macros. For example, you might want to type Invent instead of the longer Inventory all the time (wears out the keyboard, don't you know). In fact all the usual features such as ram load and save are included, as well as allowing complete control over how the text is displayed on the screen.

The command *Thinking about* will provide a way of discovering what Richard knows about people and places. This is something that has always been lacking from games where you play a character other than yourself. It is obvious that the character you are controlling must have some background knowledge of their own, but in other games you could never actually get at it – a serious omission.

A sense of humour is always important in an adventure, and this time I think it's just right. Not too sarcastic, not too silly. Unless, of course, you type something strange like "eat feet" which will produce an equally silly reply. I also like the response when you ask for your



Examine everything, read the runes

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On the top moor road



score so far.

If you are stuck, the menu system might provide some clues. All the possible verbs are there at the bottom of the screen and can easily be selected with the cursors keys or a click on the mouse.

Once a verb such as Drop has been highlighted, all the objects being carried will appear. You might think that having all the options displayed like this will make the puzzles easier to solve, but this isn't the case, as the problems require some thought.

Graphics are provided for all main locations, loaded from disc when needed. They take the form of small sketches to help you visualise what is going on but if, like me, you prefer to stick to the mental images conjured by the text, you can ignore the drawings if you wish.

Demon's Tomb uses a good system, combined with an interesting plot. It is a tough adventure, with many locations and puzzles to solve, and should appeal to the old school of adventurers.

John Kennedy

Demon's Tomb
£19.99
Melbourne House

Aura
Story
Graphics
Value

Overall – 71%

VORTEX

Don't get taken in

Visionary Design £19.99

Atmosphere
Graphics
Gameplay
Value

Overall – 69%

EVER had the feeling that something's going on and you don't know what it is? Could it be that a large and hungry black hole is travelling across the universe to get you?

Take on such a foe but be careful – in tests Vortex went on killing people after ordinary solar disturbances were washed away.

What's the point of singularity? Two people can team up to kill the vortex faster. Collide with its food (asteroids) and clog it up with antimatter in a kind of interstellar bar-billiards match. But it'll be back – and one of these days...

Gets a bit repetitive after a while but there is an element of strategy. Two player mode is a must.

Green



STAR FLIGHT

Ticket to the moon

CAPTAIN'S log stardate 30-10-4619: Having outfitted my ship and selected my crew I am preparing for my most dangerous mission yet. Apart from seeking out strange new worlds we are expected to assess them for future colonisation.

Despite the urgency of this mission I have been given little money to outfit my ship. Hopefully we will be able to collect enough valuable minerals to trade in for something useful on our return.

Captains Log (supplemental): I have promoted Perky to First Officer. He is only an android but seems more capable than the rest of the crew. Mr Waffle is particularly poor at his duties – perhaps I should have spent more money on training him. Unfortunatley it is impossible to train androids so when I have the money I'll have to scrap Perky. Ho hum, the trials of being a captain.

Captain's log stardate whatever: We've been in deep space for a while now. I find the ship really easy to handle. Everyone is taking orders properly.

Due to the inexperience of my navigator we have had a few near misses with flux holes. These can instantaneously transport the ship to another part of the universe, but we may not have the fuel to get back. Eridium consumption is pretty high with our inefficient engines – we'll have to invest in some high technology when we get back.

Supplemental: Did I notify Microlink of my change of address?

Captain's log stardate 5-1-4620: Made orbit around a likely planet but realised just in time that if I landed we would never be able to take off again due to fierce gravity.



He's got a dreadful pain in all the diodes down his left side

Next planet in this system seems more hopeful. According to sensor data it might be suitable for colonisation, but I think I'll pop down to the surface and give it the once over personally.

If a couple of colony ships full of telephone sanitisers turned up here all ready to go and discovered there was no surface water, things might get a little rough for me back at base.

Supplemental: Made good planetfall. Opened the viewport on the way down but although the view was quite pretty it took an awful long time. Think I'll give it a miss in future. The little All Terrain Vehicle works well. I put on the auto-scoops and we have excavated lots of valuable promethium deposits.

Second Lieutenant Mr AJ suffered some minor injuries when we got caught in a wind storm but he'll pull through – probably. We have encountered several types of organic life forms. I stunned a couple with the vehicle's weapons and we will take them back for vivisection – if we don't get too hungry on the trip home.

Captain's log stardate unknown: Dear diary, we had a pretty lucky escape down on the planet's surface. A snowstorm blew up and we lost track of where I'd parked the ship. When the clouds lifted so to speak we discovered we were but a few scant yards from the ship.

We had to leg it but no one was lost or injured. Unfortunately this means the ATV was lost and all the stuff we had collected. Someone's not going to be very pleased when we get back.

Captain's log stardate 1-4-4620: On our way home we encountered an alien vessel. I dropped the shields and offered the paw of friendship via the communications officer. Unfortunately since he was so badly trained I could only understand every third word of the other chap's message so I'm not really sure what he was on about.

If it was that important he'll send a telegram or something.

Supplemental: The good ship Amiga Computing pulled alongside and asked me to report on how my vessel was behaving. I had to tell them in respect of graphics and sound it was not overwhelmingly endowed but that this was incidental to the main task of investigating, exploiting and colonising a big universe.

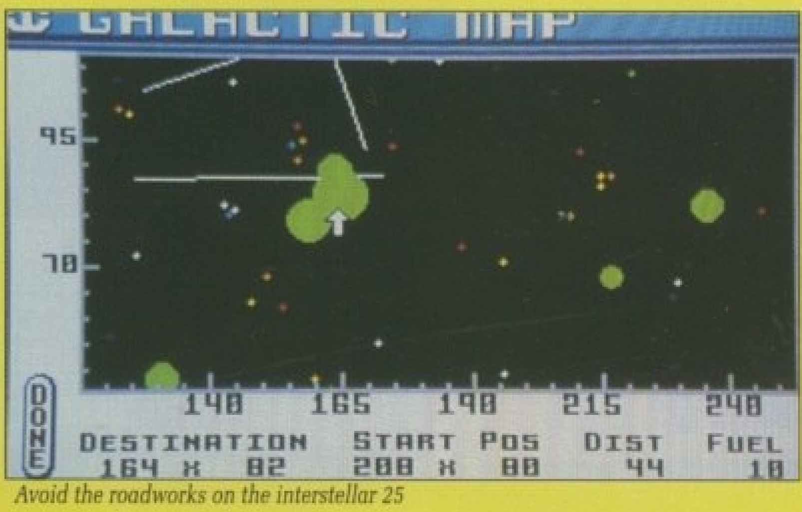
This was shortly before they sailed straight into a black hole of course. Shame. Nice ship. Looks like a fish, moves like a fish, steers like a cow...

Green

Star Flight
£24.95
Electronic Arts

Atmosphere
Graphics
Gameplay
Value

Overall – 86%



Avoid the roadworks on the interstellar 25



Klingons on the starboard bow

KICK OFF EXTRA TIME

You have to be on the ball

EVANS is away on the left, he's past one defender, he's past another. There's spectators on the pitch. They think it's all over.. Evans slams the ball into the top left of the net. It is now !!

England may not win the World Cup again, but they should give Eire the thrashing they deserve (he said in a partisan manner). Yep, I've just seen a World Cup draw where luck took a back seat, and troublesome fans guaranteed a seeded position.

One man may not be an island, but 11 men will have to play on one.

Kick Off was the best footy game of '89, in fact the best action footy game ever. Now Anco has released an expansion disc.

This is Extra Time, the expansion disc to Kick Off that provides extra referees, formations, playing surfaces, kicking abilities and winds.

The referees are inconsequential, which is something that could be levied at the formations. Blitz, Crisscross, Falcon and Lockout are the four new formations added to the regulars.

However, Blitz is an all out attacking formation that is as effective as Liverpool playing 4-2-4, with Rochdale's strikers as the front four. It just doesn't work.

Crisscross is equally hopeless. This formation is supposed to enable your team to keep possession of the ball. Does it it? Does it hell.

Falcon makes good use of your wingers, if you have good wingers that is. But that results in your equivalent of John Barnes sprinting down the wing only to find that Ian Rush is still plodding in the midfield area.

Playing a 4-2-4 with fast wingers is just so much more effective. All of which leads us on to the only new formation that is really worth the time of day – the Lockout.

This entails most of your squad hanging around your penalty area to such an extent that they are in danger of being arrested for loitering. In fact, the Lockout is far too effective, and when the computer plays it, you'll learn the meaning of the word frustration. Ho hum, so what new surface can you look forward to playing on? Well, there's artificial (Oldham), Normal, Hard, Soggy and Wet.

Now then, what was the only problem with Kick Off? It was the fact that the ball skidded off the surface faster than the players and they could rarely catch up.

So what has Anco done with the new surfaces? Made it so that the ball slows down? Nahh, that might be useful. Most of the surfaces actually make the ball bounce higher and run faster.

I really can't believe this. I'm sorry but I can't. This is stupidity beyond belief. There's only one surface, soggy, that makes the ball slow down, but the players also slow down as well, making for an irritating game.

Talk about opportunities missed. This is like Lineker on a bad day.

What's next, ah yes, the most fundamental change of all. The ability to kick the ball. You can now kick the ball at various strengths, in fact you could before, but now it's supposed to be more deliberate.

As soon as a player picks up the ball (it'd be handball – but you know what I mean), the line underneath turns white. It then starts turning black, pixel by pixel – the more white white pixels when the fire button is pressed, the stronger the shot.

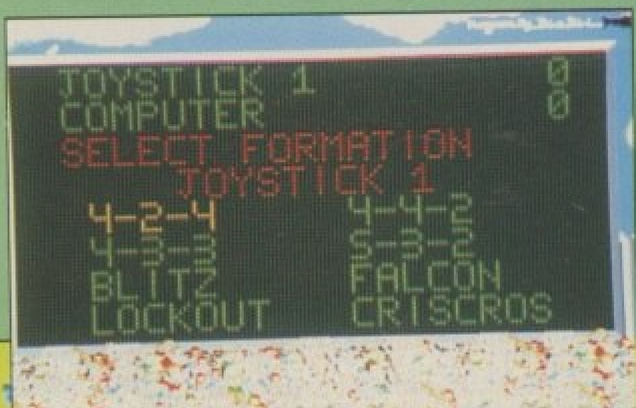
All good and well in theory, after all it sounds quite natural. However in practise this makes the game very hard. Why? Because Kick Off is an instinctive game relying on very fast reactions to score goals and clear the ball. It all results in desperate clearances being kicked all of three feet to a marauding striker, and shots on goal turning into harmless prods into the goalie's arms.

Naturally the computer teams can hit pixel-perfect balls every time, so even playing Russia, the best team in the league system, it's still an uphill struggle.

Add to this wind factor 10 and you can have games where skill sits and watches in the stand while the artless slog it out on the turf. The wind factors can be quite amusing if set to Crazy level. A goalkeeper can even score at the other end with one kick.

Although most of these improvements can be turned off, doing so would mean that you had wasted your money. To be honest, if you have completely mastered the original game, and are looking for a real challenge, then Extra Time is it. Otherwise, stick to Kick Off, because beginners are heading for hours of fruitless frustration.

Duncan Evans



What you need if your tactics are bigger lemons than tic tacs



It's a funny old game

Kick Off Extra Time
£9.99
Anco

Options
Graphics
Gameplay
Value

Overall – 65%

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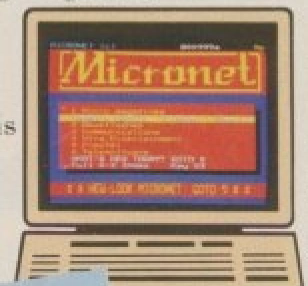
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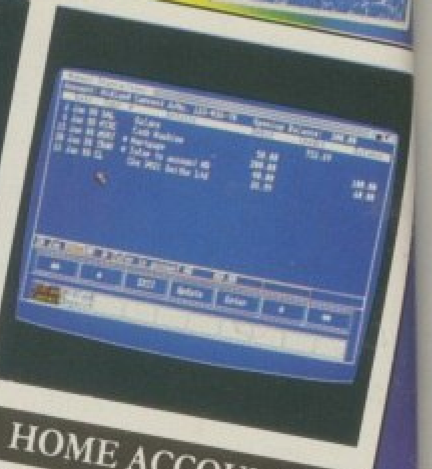
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X-OUT

Flash the message, something's out there

BLISTERING barnacles. What a load of rotten fish. After years of waiting, the great assault on mankind has at last materialised. While we watched the skies they massed their forces in the oceans. Now they're going to pay us back for all the crap we dumped in the North Sea.

A bunch of highly evolved fish have developed weapon technology far surpassing our own. Instead of mounting a takeover bid for GEC however, they seem intent on destroying the human race.

Well just wait till you get hold of them eh? You'll knock them off their perch. They thought we'd just clam up without moving a mussel did they? Well they'll have to get their skates on to escape without a battering.

Two defectors from the enemy camp are on hand to be of assistance. For a small fee they will supply you with a selection of ships and advanced bolt-on weaponry.

This is quite a novel aspect of the game. Instead of having to blast, say, 20 red aliens with funny ears and collect the glowing orange pod that they drop you can now pay up front for any weapon you might want.

Saves on the potential embarrassment not to say inconvienience encountered should a previously unnoticed alien life form incapacitate your craft on the way to pick up said glowing orange pod.

Of course this means you must have the neccessary dosh. You start out with a small advance, but further sums depend on your score during a particular level.

Everything you mercilessly blast is worth points. And what do points make? – weapons! Unfortunately this means that if you buy lots of equipment at the beginning of each level you could end up having no score to speak of. Them's the breaks, I guess.

Smoothly sideways scrolling through an ocean tench, sorry trench, notice the wonderfully crafted backdrops. Don't notice them for too long though or you'll fall foul of wave upon wave of demented avengers.

Admittedly when you're armed to the teeth some of them regard you with much the same attitude as I'm sure the fattest of the fatted calves adopted when he happened to notice the prodigal son turn into the drive.

Most of the piscine efforts are but poor players on the stage of life who strut for a few milliseconds before they are gone and seen no more.

The obligatory end-of-level beastie, and the now *de rigeur* half-way through level beastie put up a pretty good showing though. A lot of advanced planning is required to have the right weapons available to be able to deal with these hazards effectively.

As shoot-'em-ups go this is one to take note of. What is lost in originality (and let's face it, who has written a truely original alien-blaster recently?) is more than made up for by the wonderful graphics and fast action.

Gameplay is excellent, although the game can be very tough at times. The only thing that mars the whole effort is the loading. Obviously a penalty for the detailed graphics, levels can take more than the customary couple of seconds to start up from floppy.

There is also an unnecessarily long wait, when you die, for the high score table after which the main game has to load in again. However, these faults can be easily forgiven when a game is as good as this.

Lovely graphics, lovely sound, lovely action, lovely game.

Green



If you want to get ahead, get the head

X-Out
£19.95
Rainbow Arts

Sound	
Graphics	
Gameplay	
Value	

Overall – 90%



This is no time to be playing sardines

THE HOUND OF SHADOW

Ding-dong Cthulhu calling

HAVE you ever thought that beneath the everyday and mundane aspects of existence lurks such supreme terror and depravity that the human mind just has to filter it out.

Next time you are stuck on the tube for an hour it may not be simply that London Regional Transport are a bunch of bungling buffoons – it may be some dark and occult force that have made them that way.

It may have been encounters with LRT that led the famous patron of such schools of thought, H.P.Lovecraft, to pen great works on this very topic. Such has been the appreciation of his efforts that the frenzied paranoic masses invented a role-playing game of the same subject, Call of Cthulhu.

Now, I am making no statement whatsoever on the social adjustment of the people at Electronic Arts, but they too have decided that this is a pretty neat idea and have released this, the first in a series of adventures in this vein.

I say adventure, but much of the first disc is taken up with the generation of a character so it is more correct to say the first of a series of role-playing games set in an adventure environment, or something like that. Probably.

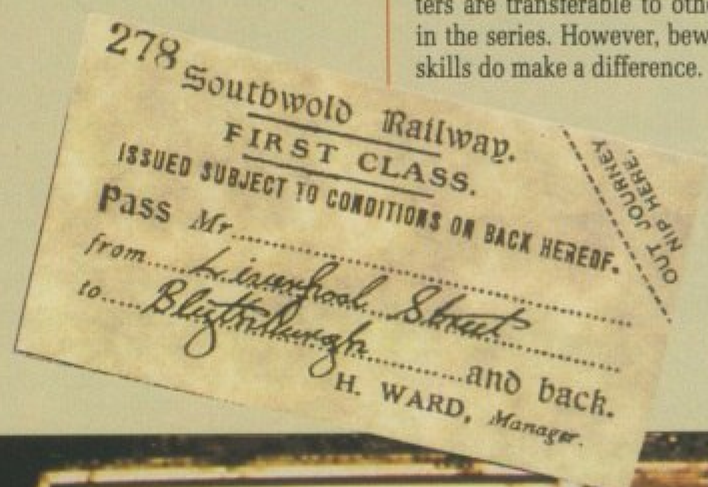
The character generation ends up producing a fairly Cthulhu-like character, which is no bad thing. Players must first choose their name, sex and nationality (British or Yank), at which point they will be presented with a brief physical description of their character.

If they find themselves unable to get into the role of an ugly, overweight slob it can always be thrown back into the electronic maelstrom.

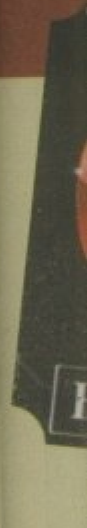
Next up is occupation. If you chose to be a woman I'm afraid that not all of the professions are open to you, but before my sisters of liberation at OASIS launch suicide bombing raids on EA HQ I'd like to point out that this is in keeping with the period of the '20s, when this game is set. Professions include amateur sleuth, occultist, novelist and the very honourable, noble and just career of journalism.

Your choices so far will give a start in some skills and a fund to enable you to practise others. Some skills may not be relevant to this particular scenario, but the characters are transferable to other titles in the series. However, beware, the skills do make a difference.




278 Southwold Railway.
FIRST CLASS.
ISSUED SUBJECT TO CONDITIONS ON BACK HEREOF.
Pass Mr. ....
from ....Liverpool Street....
to....Blythburgh....and back.
H. WARD, Manager.
OUT JOURNEY (NIP HERE)





What do you mean you don't have back issues of Amiga Computing?

Was it for this that daddy ded?

Your immediate task is to stay alive. There are some very strange goings on, er, going on. You'll be well into the game before you start to understand what you have to do.

The adventure surrounds the mysterious town of Blytheburg and a mythical black dog, the hound of shadow. Although much of the action takes place initially in London it will be necessary to travel to Blytheburg in the course of your investigations.

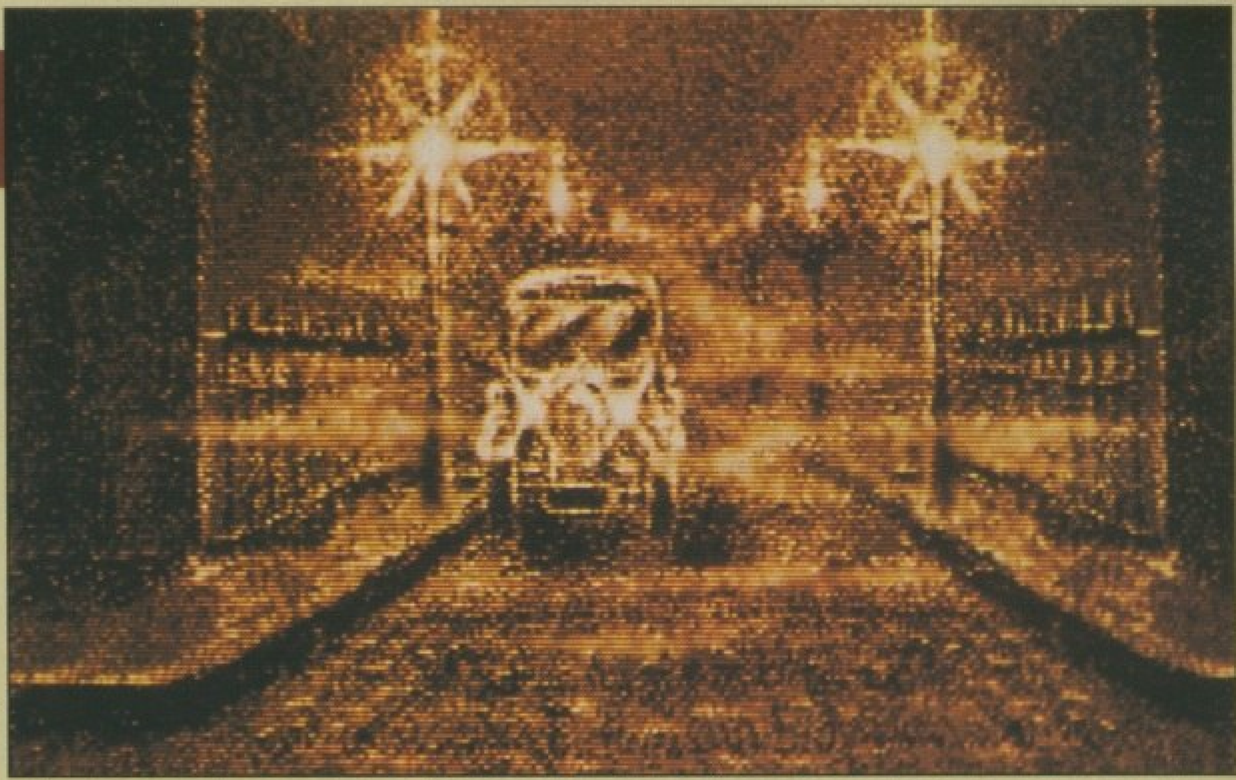
A lot of investigation also takes place in the reading room of the British Museum. Getting in may be the first test of your abilities.

One aspect of the game I was particularly impressed with was the interaction with other characters. No longer is the player assumed to be the only intelligent human being in existence. Other characters also make observations and suggestions which, while sometimes it may seem that they are dragging the plot in a direction one might not particularly wish to take, is certainly far more realistic.

The game is interspersed with lovely sepia-toned screens of the more important locations which certainly add to the atmosphere and, even if you are not taken that way, are just nice to look at. This is all in keeping with the great attention to historical detail and conformity with the works of Lovecraft.

This is the best presented adventure I've seen for a while and definitely the most interesting. I would be happier looking forward to the next in this series if only I could convince a rather large hound from Satan's own stable that Bonio are far more tasty.

Lucinda Orr

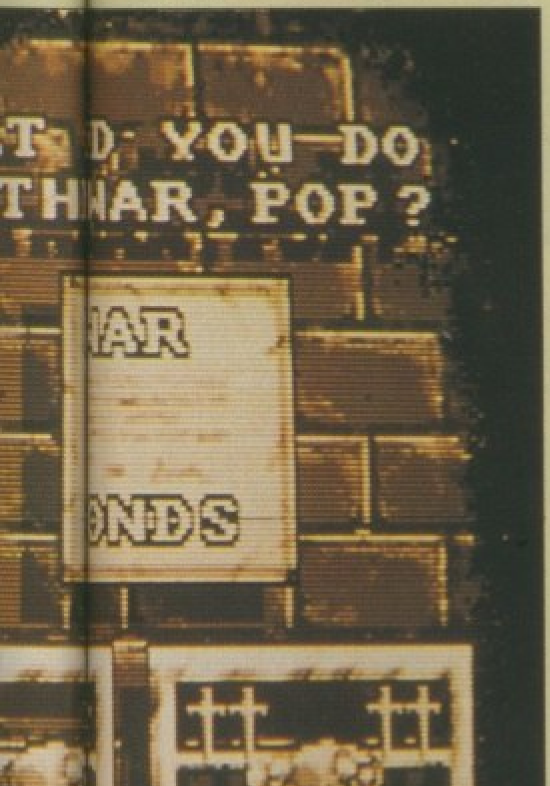


Is this a one way street?

The Hound of Shadow
£24.99
Electronic Arts

Aura	■■■
Story	
Gameplay	
Value	

Overall – 89%



GOLD OF THE AMERICAS

Only 9 carat

REMEMBER imperialism? The concept that gave us Hong Kong, the Falkland Islands and the Commonwealth Games? Now you too can re-live the heady days before potatoes and stomp the British jackboot all over a lot of unsuspecting natives, way back in the times when pirates made their living of the ocean (some things never change).

Up to four people can play, representing France, Spain, England and Portugal – unused countries will be run by the computer at one of three expertise levels. Explore new territories, exploit new colonies, kill lots of natives – it's all there.

Chose a random game or set the parameters to Historical for chronological accuracy. Simple to play but with lots of cunning strategy under the surface. Trade hot ashes for trees and build an empire on blood, toil, tears and sweat – preferably someone else's.

Green



SSG/EA *£29.95*

Realism	
Strategy	
Gameplay	
Value	

Overall – 67%

SUPER CARS

Life in the fast lane again

Excellence



He may be dodgey but don't you dare say so


Screeeeeeeech!

SOMEONE has copped out. Here is a game with three of the most interesting cars due to be produced in 1990 and Gremlin Graphics has cheated on the names.

Instead of using the names Cizeta Moroder, Alfa Romeo and Honda, Gremlin has made up some silly wimpish names. But that will only worry the real car buffs.

The game is what matters, and at first glance it doesn't look anything special. Nine Super Sprint style tracks which scroll as you race computer generated cars around them.

But that first glance rapidly turns into something more. A determination that you can do better if you try again. And you will: your line improves as you learn the circuits.

Race wins produce prize money, which can be spent on repairing the car after the last race – there is bound to be some wear and tear – or by buying bolt-on goodies like a turbo or missile which lasts one race, or by trading in your car for a new one.

The garage assistant looks as though she has escaped from a Cinemaware title. Buying a car is hard work. Even if you win a couple of races and do very little damage to the Blue Zagato you start with it is unlikely that you will be able to afford the next vehicle without haggling.

You'll have to haggle hard with this new car salesman to get a decent price out of this Monty Python loving vegetarian with an Oedipus complex. The buying and selling adds both a random element and some tactics off-track. But it is when the light go green that skill really starts to count.

The rival cars start to spread out since each has a level of skill. If you play dodgems a bit and let a slow computer car in front of a fast one you can start the kind of pile-up which will let you romp away with the first prize.

There is nothing special about the game, yet the more you play the more you want to. I kept going even after my trigger finger started to hurt. What the game lacks in sampled speech and dazzling copper lists it makes up for in sheer gameplay.

Simon Rockman

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Sound	
Graphics	
Gameplay	
Value	

Overall – 87%



Petrol's expensive, she doesn't even give stamps

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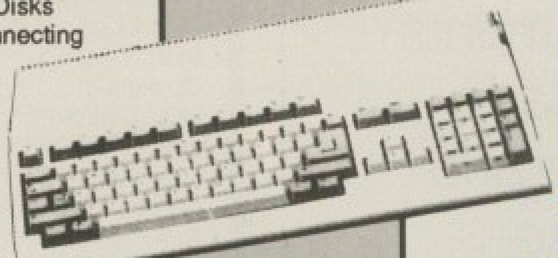
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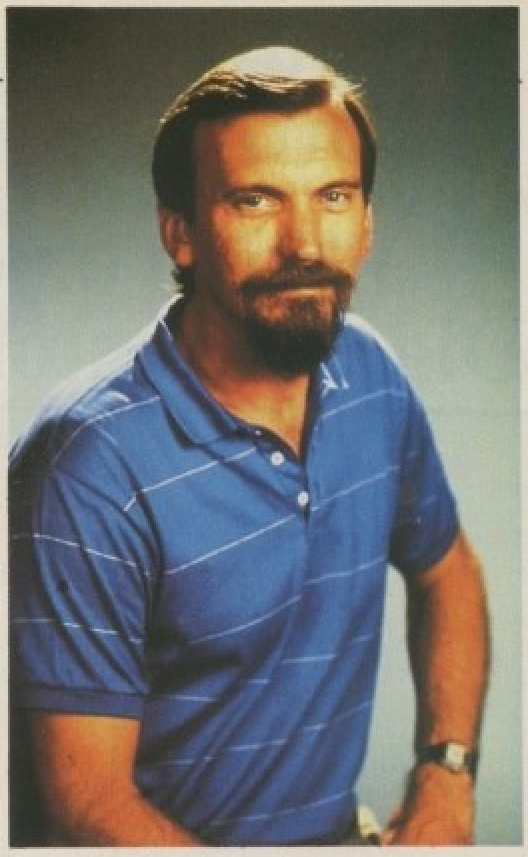
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Once again, from the top

Yes, darlings, John Kennedy looks at take three of Deluxe Video



Deluxe Video author Mike Posehn is an artist and programmer

PRODUCERS names appear at the end of the credits after a TV programme, next to directors and the Copyright MCMXM bit. Excitable people, always deeply interested in what they are doing, running around with clipboards and ballpoints around their necks on pieces of string.

When you were small you might have asked your mother "What do producers do?" and she would have answered "They produce things. Get your feet off the sofa".

Producers do indeed produce things, and a lot of time and effort it involves too, not to mention the incredible expense of setting up a shoot. For those of us who would like to make our own TV programmes but lack the financing of huge advertising revenues and licence fees, Deluxe Video III may be just what the director general ordered.

DVideo III is the new improved version of Deluxe Video II, which may not come as a great surprise. This updated version has been rewritten from scratch, and now supports anim files, more tracks, user interaction and Midi control.

So what is DVideo? It's all very well saying it's an improved version, but an improved version of what exactly? DVideo is a program which allows you to combine IFF picture files, animations, brushes, sampled sounds and tunes all in to one neat package or "production".

A finished production consists of one or more "videos", comprising scenes, tunes and so on. To alleviate the problems of limited memory and disc space, the first video can pass control to the second, the second to the third and so on. This means your epic remake of Ben Hur can last as long as you have disc space to store it.

BY using the joystick and keyboard options, the next scene or video to be played can be chosen by the user, allowing complete interaction. I guru-ed once or twice when passing control to another video, but after a bit of cutting and pasting it seemed to sort itself out, and the problem didn't recur. The moral is to keep videos short and save often.

Each video is made up from a collection of tracks – video tracks, sound tracks, control tracks and so on.

As an example, a video track could include a scene which fades in a picture, puts some text on it and then fades it out again. Brushes, animations and anim-brushes (brushes composed of several parts) are controlled from within scenes and all can be manipulated.

Playing an animation backwards is about the only option missing. Even this can be faked by turning the animation into a anim brush, and then playing it back in ping pong mode.

Text can be overlaid on images and moved around to produce scrolling credits. The movement of text and brushes is definitely not perfectly smooth, which is a bit disappointing. It's a matter of taste as to whether or not you find it acceptable. I learnt to live with it.

One way to distract the viewer's attention from the trembling graphics is to provide some sound effects. Standard SMUS music files and samples can be played, and parameters such as volume and tempo altered.

Midi signals can be stored and replayed, although the timing will not be quite as accurate as with a custom Midi package. In between scenes, new information must be loaded in to make the best use of the ram available. This sometimes causes a small glitch in the music or animation.

By using the expert mode, which gives you full control when data is loaded or dumped, such glitches can be avoided as tunes or effects can be pre-loaded.

Tunes are completely separate between videos. This means that with longer productions split into several parts the sound track is disjointed.

For the serious desktop video user (darn thought I'd get away without using that phrase) a special type of event allows ARexx messages to be sent, which means, in theory at least, you could control a frame-by-frame VCR or a genlock device.

Editing is easy. Lift icons, move

them about and plonk them in the right place. Events are represented by small boxes which are placed on a track labelled in fractions of a second.

The time scale can be magnified and reduced to allow the start and end arrows of each event to be carefully positioned. I would have preferred the magnify to be a bit stronger, because synchronising sound effects with an animation proved a bit hit-or-miss.

Deluxe Video III comes with a program to construct simple slide shows. It works well, and constructs a video script which you can either just click-on-and-go, or edit to change effects and time delays.

Another program helps with moving the various files which make up your video on to a floppy for your friends. A distributable player program is also supplied so your friends can watch the files without infringing copyrights.

THE manual is the usual comprehensive EA volume. I could only find one minor mistake (in the hard disc installation) and contains nearly everything you need to know.

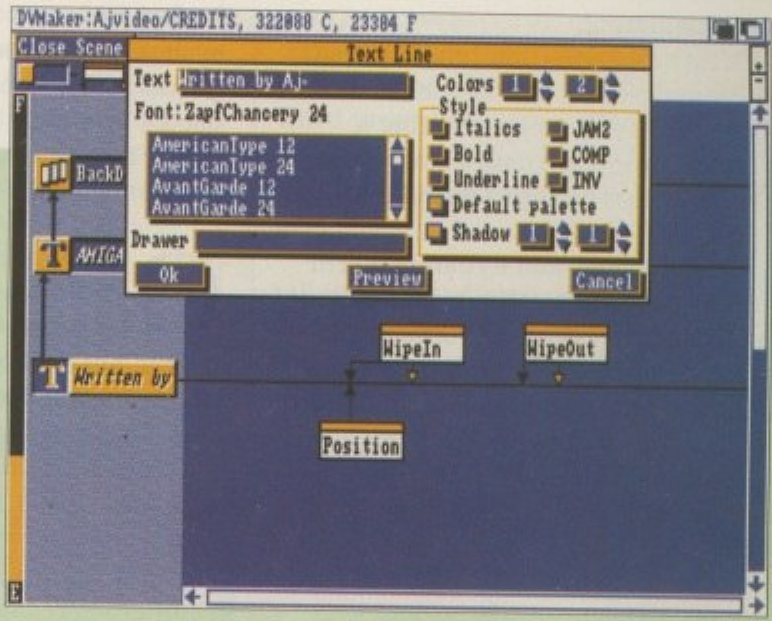
The excellent tutorial section will drag you through all the possible options. Once you have finished this, the next thing to do is to set yourself a goal, sit down and do it. The manual works well as a reference guide, although is a bit skimpy in parts.

Putting together a rolling demo is something which DVideo achieves with ease. All your IFF screen shots and animations can be merged into one professional-looking film, complete with sound effects and tunes. Hopefully I'll be able to produce one featuring the staff of *Amiga Computing* for the next computer show.

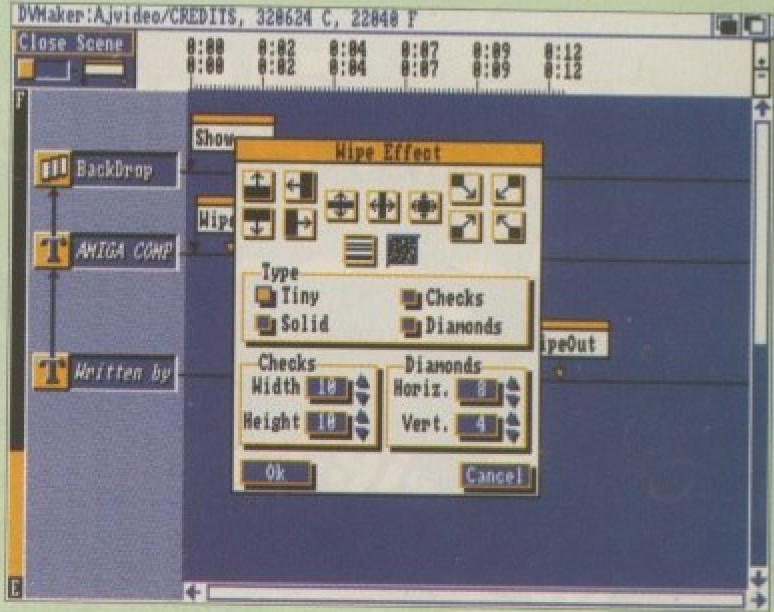
Apart from the achievement of splicing all your short animations into one, there are serious applications for DVideo. Of course you could use DVideo to generate a list of credits for your home video and genlock them over, but that's only scratching the surface.

Imagine an estate agent's shop

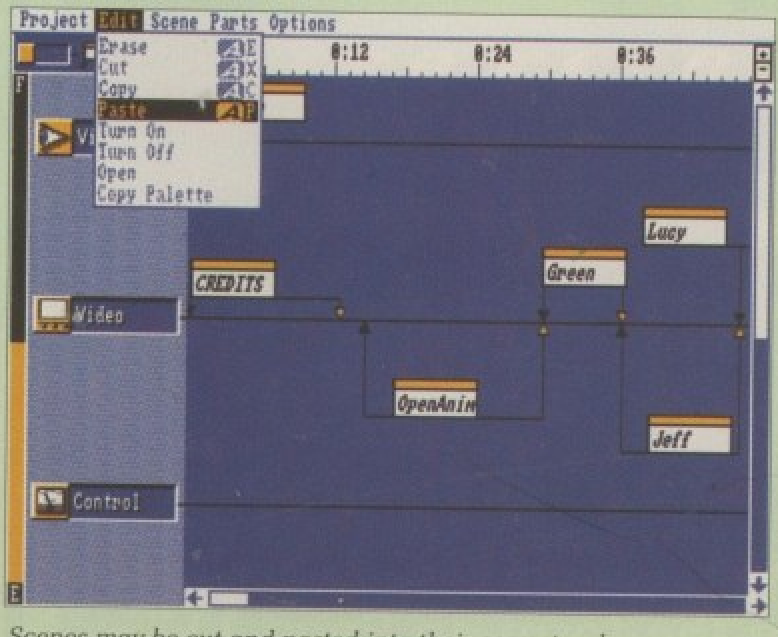
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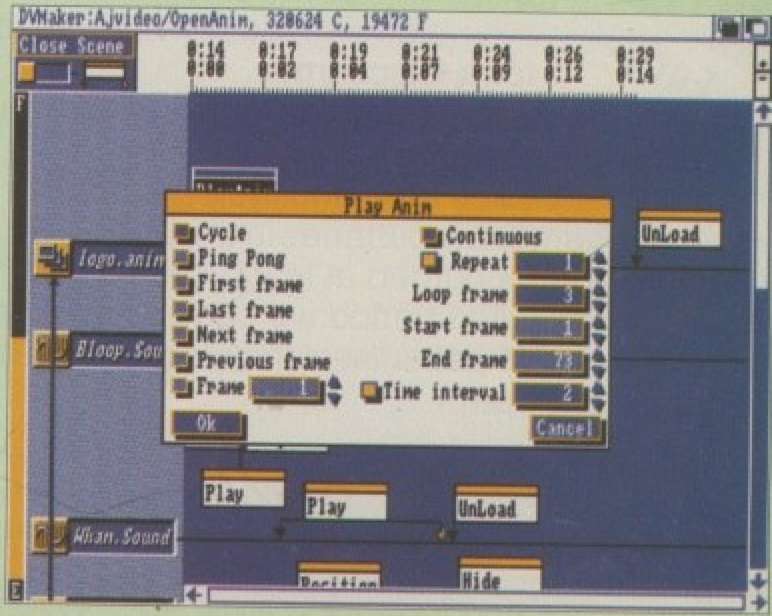
Text can be displayed in any font with full control over colours and drop shadows



How each new scene appears depends on the effect chosen



Scenes may be cut and pasted into their correct order



New for DVIII; the ability to display animations

window after hours, with digitised pictures of houses appearing on screen, along with prices and descriptions. If you had lots of ram and hard disc space, you could rotate the houses to show all possible views. And all with a soothing, Musak accompaniment.

Picture an exhibition in a large hall, with hundreds of stands scattered everywhere. An Amiga running a DVideo production could store maps which visitors could examine by means of the joystick.

In the exciting and dynamic world of business, presentations are common and are usually boring overhead projected affairs. Even the slide show program running on the Amiga would be an improvement. Or the company may wish to provide training facilities. DVideo could be the heart of an interactive video system.

Story-boarding is the laborious process whereby animators and advertisers create rough outlines of ideas, without resorting to expensive filming. The standard procedure is to knock up a few rough drawings and imagine what they would look like animated. DVideo would be a better visualisation tool with real animations.

You can use Deluxe Video on a 1 meg A500 with a single drive. It won't be fun, but you could do it. A sensible system would comprise a hard disc and as much ram as you can afford. I used a fast, large capacity drive with a 1 meg machine and rarely had problems.

OTHER hardware which should be added to the category of useful, but not essential, include video digitisers and sound samplers.

If you intend to store your creation on video tape you'll also need to make sure you have all the relevant leads. Most new new videos have Scart connections, so all you need is a standard Amiga to Commodore monitor lead.

From the software point of view an art package such as Deluxe Paint II or III is almost a necessity, with Photon Paint or similar if you are into HAM mode.

Deluxe Video is best viewed, not as a stand-along program, but as a way of combining all the output from your sound and graphics packages into one – something it does very well.

REPORT CARD

Deluxe Video III
Electronic Arts 0753 49442
£99.99

EASE OF USE....
Cut here, paste here. Easy.

SPEED ....
Apart from scrolling, everything is okey-dokey.

VALUE.................
Bit pricey, considering you'll need half a dozen other products to make the most of it.

OVERALL 84%

A useful tool.

ULTRACARD
The ultimate database?

John Kennedy navigates his way between the hype and the hypermedia

YOU may be forgiven for thinking that the terms Hypertext, Object Orientation and Hypermedia Information Construction Sets are nothing more than blasé American computer jargon. But believe it not, deep down, under all the hype and twaddle, there does exist a genuinely interesting theory about information management.

The idea – or concept, I should say – boils down to a form of computer database that not only stores text but can also handle graphics and sounds, all in a user-friendly, interactive, have-a-nice- day, mom's-apple-pie way.

The items of information, in whatever form they may be, are stored in stacks of frames which the user can browse or navigate through by clicking on gadgets and selecting various options. This browsing is supposed to stimulate interest, just as flicking through a book or magazine can suddenly trigger off an original idea when you see something that interests you.

Hypertext was initially only available on the Apple Macintosh, mainly due to the hi-res graphics and memory needed. The fact that the Mac was the first computer where people needed to store text, graphics and sound in any form at all, also helped.

And in the age-old way of Mac-orientated people, the principle of Hypertext was claimed to be an incredible step forward in human/computer interfaces. It certainly sold a lot of software and got many column inches in the Mac press. A success in any accountant's book.

Now you too can share the experience, as Ultracard from Canadian Intuitive Technologies brings cut-price Hypermedia systems to your Amiga, with two discs and a funny shaped manual.

After loading you are placed in the Control Room, from where you can access the various stacks, including the main instructions. Everything works with mouse-clicks and menus, although not as well as you might expect. After reading all the bits and pieces you will feel little more than bemused and will wonder how to go about creating your own stacks.

A good question, and not one immediately obvious from the available information.

The use of the standard Amiga IFF protocol makes integrating existing sounds and images a relatively straightforward affair. In fact, IFF works so well you might be tempted to ask why bother with a program such as Ultracard.

Do you really need to be able to integrate sounds with graphics and text? I usually keep my sound samples in my music package and my graphics in my art package. If I want to combine them I use a package like Deluxe Video. My text stays in my word processor, and sometimes makes excursions to a database with next to no problems. No Hypermedia needed here.

However, if you're set on creating a talking instructional manual with text and graphics, with Ultracard you might just have loaded the correct ➤





➤ package. The scripting language is how such programs can be written. As an example, a simple name and address database is supplied. Hardly breathtaking, but it proves that something potentially useful can be achieved.

You will no doubt be over the moon to hear that Ultracard supports ARexx. The explanation of ARexx is often stated thus: If you don't know what it is, you won't be able to use it. This is a very annoying explanation, so permit me to give you a better one.

ARexx is a standard communications protocol developed by William Hawes which allows different multi-tasking programs to pass commands between one another. In theory, a completely separate program could be controlled from your Ultracard environment, for example to drive some external hardware.

A public domain program called UCBrowes is supplied to allow you to freely distribute any stacks which you may have created.

If you plan to spend a lot time with Ultracard, a hard drive is extremely handy. In fact it is almost essential because stacks take up a lot of disc space.

Sometimes using Intuition and sometimes using strange gadgets gives Ultracard an awkward feel. The inconsistency remains throughout, with pointers assuming strange shapes more or less at random and requesters appearing with meaningless error messages. The overall impression is that of a rushed product.

Ultracard is also crippled by an appalling manual. Pretentious and patronising, it passes the buck to text files available from within the program and encourages you to access a bulletin board for more information. This might just be forgivable if the text files were useful and, assuming you own a modem, the bulletin board was reasonably local. Unfortunately the text files are worse than the manual and the bulletin board is in California.

As a concept, Ultracard is an interesting piece of software. As a piece of software it is too badly produced to consider using.

REPORT CARD

Ultracard
HB Marketing 0895 444443
£39.95

EASE OF USE....
With a Wimp environment, Ultracard should be easy to use. Bad instructions mean it isn't.

SPEED................
Doesn't do that much, so speed isn't an issue.

VALUE.................
It may be priced at the lower end for serious software, but real quality always costs.

OVERALL 40%

Hypertext is a wonderful concept. Ultracard is dreadful software.

Read all about it!

Citizen Green buys a sled called Snowdrop and becomes a press baron overnight

MENTION the phrase desktop publishing, or even better, DTP, to anyone seriously into computers and they will go glassy-eyed and do one of two things. Either they will slump forward and do a fair impression of a Canadian log-sawing contest or they will start babbling about Aldus Pagemaker and Ventura.

While once it was acceptable to think that DTP was only truly possible on the Apple Macintosh, people are now waking up to the fact that results of the same standard can be obtained on home micros such as the Amiga. At least this seems to be the view of Gold Disk, which has just launched PageSetter II on to the market.

The original PageSetter was good but lacked certain features, which made some things very difficult and others impossible. This was not too serious, because it was aimed at the low end of the market, for people who weren't taking it all that seriously. The question is, does PageSetter II take DTP seriously?

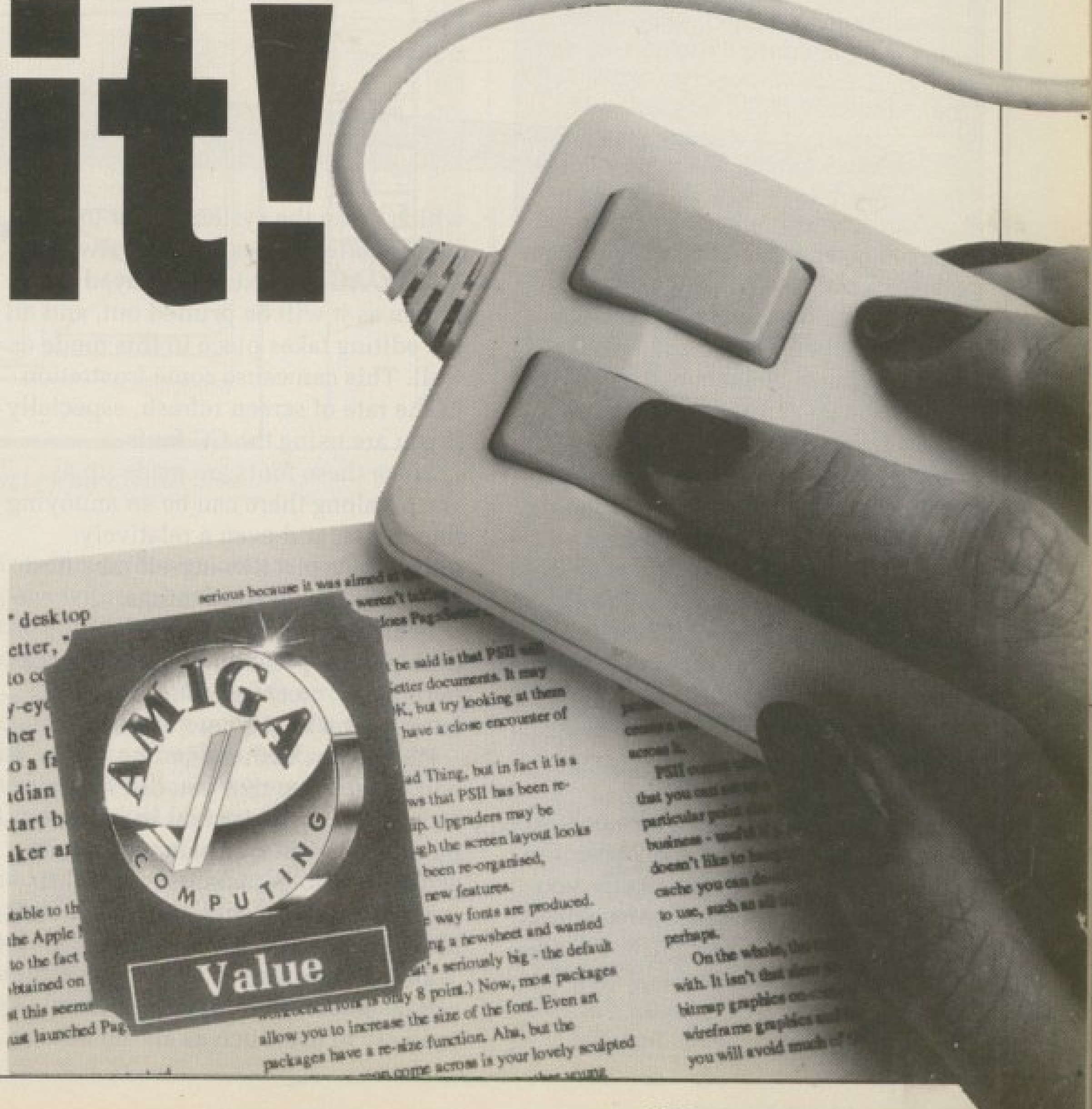
The first thing that must be said is that PSII will not load any original PageSetter documents. They may appear to have loaded OK, but try looking at them or printing them and you'll have a close encounter of the guru kind.

This may seem like a Bad Thing, but in fact it is a Good Thing because it shows that PSII has been re-designed from the bottom up. Upgraders may be confused to find that although the screen layout looks similar, all the menus have been re-organised, obviously to cope with the new features.

The major change is the way fonts are produced. Suppose you were producing a newsheet and wanted a 96 point headline (that's seriously big – the default Workbench font is only 8 point). Now most packages allow you to increase the size of the font. Even art packages have a re-size function.

Aha, but the problem you soon come across is your lovely sculpted font begins to resemble something a rather young child might have built with building bricks. In short, you get the jaggies and the blockies.

The answer to this is scaleable fonts. These look a lot better on the screen, and when it comes to printing the output will be at the resolution of your printer – not much of an advantage if you are on a 9-pin dot matrix but a definite must if you have 24 pins or an ➤




■ REVIEW ■

Extend your Basic

Anyone who has played with AmigaBasic for more than five minutes will know that it has a few bricks missing. Stewart C. Russell looks at a package which sets out to fill in the holes

AMIGABASIC works - and that is about all that can be said of it. It will do what you ask, but only if it really feels like it, and it will never do it nearly as fast as you'd like it to.

It's hardly surprising then, that a variety of other Basics have sprung up: compiled ones like HiSoft Basic Compiler and interpreted ones like GFA-Basic, which now has a separate compiler. But they aren't cheap, so what the world in general has been waiting for is an extension library which gives AmigaBasic what it should have had all along.

The waiting is now over. HiSoft, in conjunction with SunSmile Software in the States, has released Extend. This wondrous wad of longwords won't actually make the daily running of AmigaBasic any quicker - what it does is to allow the Basic programmer full access to Intuition without having to open every Amiga library in rom and on disk. And this is a Good Thing.

Extend is a disk-based library like Translator.library and Diskfont.library. You put it in your Libs: directory. To use libraries AmigaBasic needs to access the relevant bmap file, and HiSoft provides the Extend.bmap file for this purpose.

The usual problem with using library functions and routines from Basic is that they need oodles of code to get them working. Basic and C variable types are different, one tiny error in the protocol will result in a Guru. Believe me, I know - I've been there.

Extend v1.3 contains 50 functions and subprograms. The majority of them deal with menus, requesters and gadgets, while some others deal with fonts, IFF and scrolling. The latter might seem strange as AmigaBasic does have a scroll command; unfortunately it is bugged.

If you've ever tried loading and saving IFF screen images from Basic you will know how difficult, and above all, slow it can be. Extend's SaveIFF routine saves the day. A 16 colour med-res display can be saved to ram about 60 times faster than a Basic routine would. SaveIFF also compresses the data, so the resultant file is often less than a third of the size the uncompressed data would be.

There's also LoadIFF, which quickly loads your image on to a screen that you specify. It is here that Extend shows its transatlantic origins - if you don't have a PAL screen open for a 256 line PAL image, Extend creates a very crushed 256 line NTSC interlaced screen, which looks awful. Ah well, we can't have everything.

Serious headbangers can use the ViewHAM command to have a look at HAM images. Unfortunately Extend lets you look, but not touch - HAM is too complicated for Basic to keep track of. This isn't strictly true; HAM from Basic has been done, but the routine is huge, very slow and suffers from colour banding problems, so it's not viable.

There are a few other functions for fonts, external commands, file handling, memory allocation, and even a routine to produce a "Wait" mouse pointer. Setting up the library for use is very simple, all the work is done by one command to initialise the current window.

Extend is a s forgiving as it can be, given AmigaDos's somewhat capricious nature, but if it says in the manual that a function called incorrectly will cause a crash, you'd better believe it.

Some routines must be slowed down with the PTIME command to allow AmigaBasic to catch up. Thankfully most of these are not speed critical, so the extra second or so won't be noticed.

The manual is good, written in that weary but snappy style which gets a bit old after a while. It does the job though, and it's packed with examples, which are also present on the disk - one example for every command.

What, for me, makes Extend so good is that you can use it in your programs and then distribute them without any complications. The downfall of Basic extenders for many of the 8 bit machines was caused by their non distributable status, but Extend has none of these problems - HiSoft and SunSmile have made Extend.library and Extend.bmap freely distributable.

And because you can use Extend with the HiSoft Basic Compiler, you can now write good code in Basic, and hold your head high.

Souped-up menus

AMIGABASIC, despite being a bit of a dog, does handle menus fairly well. Extend goes much further - it allows subitems on menu items, and hotkey shortcuts, like Right-Amiga-Q for Quit for instance.

On top of this you can define exactly how you want menu items coloured and highlighted. Most powerfully of all, you can set up mutually exclusive items. This is useful, say, if your program has a load option and you want to disable the save option while the data is loading. Now if you need anything more complex, you've outgrown anything AmigaBasic could ever do.

Extend gives you submenus and hotkeys, a major omission from AmigaBasic.

Easy Gadgets

THE real giveaway that a program uses Basic is that there is complete lack of gadgets, or at least, proper Intuition ones. Here SunSmile Software gives as good a reason as any to use the word plethora in describing its options. Both boolean and string gadgets are supported. The former allow program options to be activated, the latter allow for the input of text. You can make them as big, small, dull or garish as you like - just as long as you remember to remove them all before the program is exited.

Point and click - flexible and easy to use

HiSoft Extend Command summary

68 AMIGA COMPUTING February 1990

February 1990 AMIGA COMPUTING 69

Although this was produced on a Star LaserPrinter 8II, a version printed0 on a cheap 24 pin was almost as good

➤ infra-red laser at the other end of your parallel cable.

The standard adopted by Macs and the like is called PostScript, which relies on cunningness contained in the printer as well as superior software.

Gold Disk's answer is the CompuGraphic fonts, developed by Agfa. Gold Disk reasons quite soundly that there is no point having two incredibly intelligent machines on your desk when one will do. Why go to the expense of buying a Postscript compatible printer when the job can be done just as well with some advanced software which costs less and is infinitely updatable to account for advances in technology?

Broadly speaking, any DTP package and all its features can be divided into two parts – those which make certain things possible and the features which make the system easier to use. The CG fonts are an example of something that directly effects the output; let's now have a look at some of the features which make the system easier to use.

PageSetter II uses a full wysiwyg system. All the text is displayed on screen as it will be printed out, and all the editing takes place in this mode as well. This can cause some frustration in the rate of screen refresh, especially if you are using the CG fonts.

Since these fonts are made up as you go along there can be an annoying time lapse, and even a relatively unskilled typist like myself may find himself a bit ahead of things.

In an attempt to alleviate this problem the program will, disc space permitting, create a cache of each letter's form as it comes across it.

PSII comes with a separate cache edit program so that you can set up a cache of a particular font in a particular point size before you start getting down to business – useful if you're the sort of chappie who doesn't like to hang around.

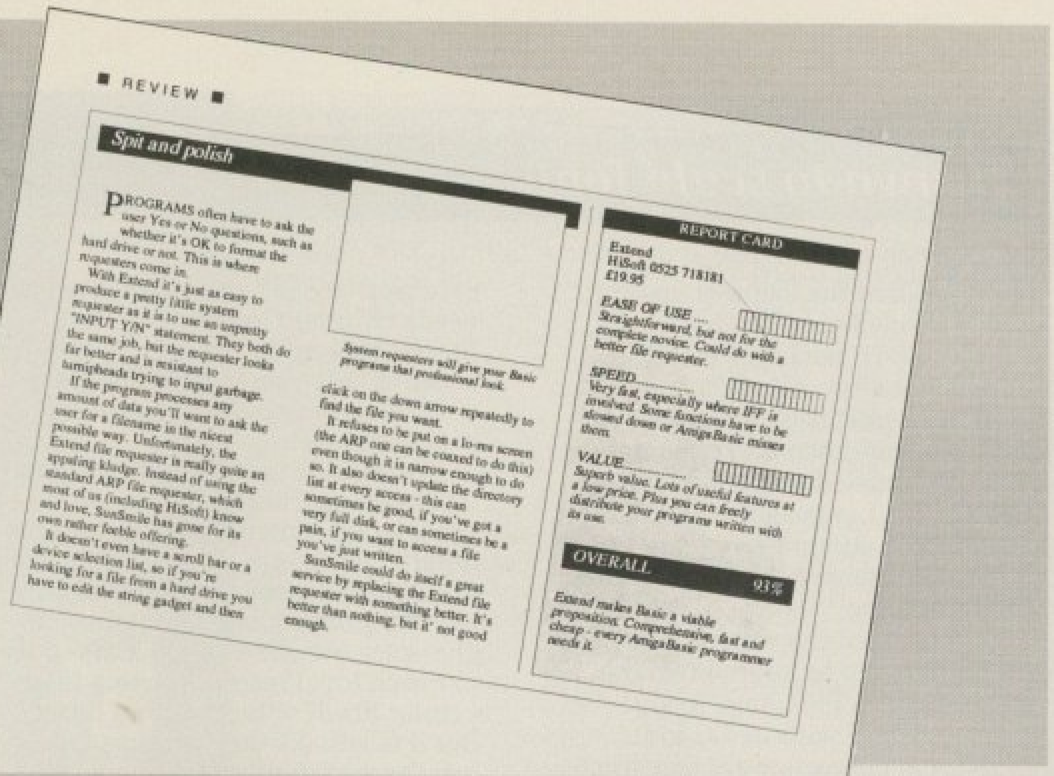
To limit the size of the cache you can de-select all the letters you are unlikely to use, such as all the foreign stuff, or numbers perhaps.

On the whole, the rate of refresh is easy to live with. It isn't that slow unless you have a lot of text or bitmap graphics on screen, and even then by using the wireframe graphics and interruptable refresh facility you will avoid much of the frustration.

One of the best features of PSII is the auto-linking, auto- column page setup. When starting a new page you can enter the number of columns you need and the width of the gutter – a term which in DTP has come to mean the blank space between adjoining columns – and the software will set up a page with full length boxes in place. No calculation is necessary on the user's part.

If you chose auto-linking as well, the moment you paste some text into the first column it will automatically flow into all the other boxes.

Linking is one of the most powerful tools in PSII. When two text boxes are linked any surplus text from the first box will flow in to the second, and



■ REVIEW ■

Spit and polish

PROGRAMS often have to ask the user Yes or No questions, such as whether it's OK to format the hard drive or not. This is where requesters come in.

With Extend it's just as easy to produce a pretty little system requester as it is to use an unpretty "INPUT Y/N" statement. They both do the same job, but the requester looks far better and is resistant to lumpheads trying to input garbage.

If the program processes any amount of data you'll want to ask the user for a filename in the nicest possible way. Unfortunately, the Extend file requester is really quite an appaling kludge. Instead of using the standard ARP file requester, which most of us (including HiSoft) know and love, SunSmile has gone for its own rather feeble offering.

It doesn't even have a scroll bar or a device selection list, so if you're looking for a file from a hard drive you have to edit the string gadget and then click on the down arrow repeatedly to find the file you want.

It refuses to be put on a lo-res screen (the ARP one can be coaxed to do this) even though it is narrow enough to do so. It also doesn't update the directory list at every access - this can sometimes be good, if you've got a very full disk, or can sometimes be a pain, if you want to access a file you've just written.

SunSmile could do itself a great service by replacing the Extend file requester with something better. It's better than nothing, but it' not good enough.

System requesters will give your Basic programs that professional look

REPORT CARD

Extend
HiSoft 0525 718181
£19.95

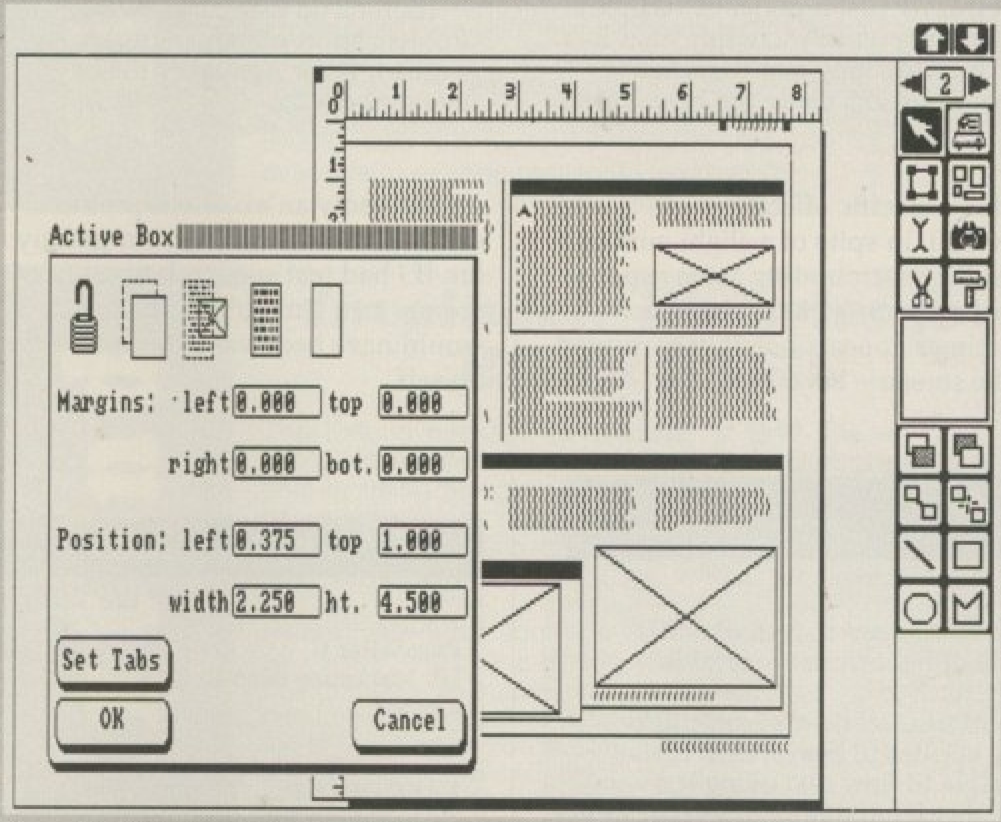
EASE OF USE
Straightforward, but not for the complete novice. Could do with a better file requester.

SPEED
Very fast, especially where IFF is involved. Some functions have to be slowed down or AmigaBasic misses them.

VALUE
Superb value. Lots of useful features at a low price. Plus you can freely distribute your programs written with its use.

OVERALL 93%

Extend makes Basic a viable proposition. Comprehensive, fast and cheap - every AmigaBasic programmer needs it.



Boxes can be opaque, transparent, or force text to wrap around them

from the second to the third, and so on if you have more boxes.

The advantages become obvious when you want to edit a piece of text that stretches over more than one box. Instead of having to painstakingly add or delete words from one box and shift them to another, it is all done automatically.

Even more cunning, if you have a chain of three boxes and decide to lose the second one in favour of, say, a large picture of the editor, then the text will automatically re-direct itself from the first box to the third.

This means that you have complete freedom to design and re-design your page without having to worry about all the effort involved, it is virtually all done for you.

The page guides, grids and coordinate references can be set between centimetres, inches or, more usefully for those experienced in typographical layout, picas.

The system of grouping together boxes is also a great help. By shift-clicking (holding the Shift key down while selecting a box with the mouse) a number of boxes can be selected as a group. The group can then be moved

➤

At the drop of a cap

EXPOUNDING on my original thesis that the purpose of a DTP package is to produce good results with the least possible effort, let me tell you the sad tale of the drop cap.

If you don't know what a drop cap is, then scan back to the beginning of this box. See the incredibly large letter E? Note how it starts at the same height as the text (I hope) but drops down taking up three lines worth of space, with the fourth line running underneath it. This is a dropped capital, *aka* a drop cap.

In the PageSetter II manual the list of uses for the impermeable box (one that text flows around instead of fills) includes that of creating dropcaps. Aha, you may think – dead simple. Just define a box for the 36 point character, make it impermeable and drop it into the top-left corner of the box containing the text.

Well done. Points for imagination and creative problem-solving. But sorry, no cigar.

The thing is, when you make the box small enough to be three normal lines deep, your large capital will disappear. Why? Because the box has become too small for the font.

But there was plenty of space below it, you cry. No, watch my lips – the box is too small for the *font*, not that particular letter. The box has to leave room for descenders on letters like j and g and y.

So that means you can't do a drop cap? No, it just means you'll have to be even more cunning and inventive. The way to solve this problem is to have three boxes – one with the drop cap, one containing the two lines to go beside it and one for the rest of the text to spill into below. The last two boxes should be linked together for text flow.

So there you have it, drop caps *can* be done – but at a price, and the price is time. If it takes you five minutes to do each drop cap and you average three to a page simple mathematics will tell you you're spending a quarter of an hour extra per page. Over 10 pages this easily stretches to more than a couple of hours.

➤

around maintaining the relative positions of the boxes inside it.

More importantly, the boxes can be accurately aligned to left, right, top, bottom or centred. This is invaluable for achieving straight lines down the edge of a complicated layout.

It is plain that Gold Disk is taking DTP seriously with PageSetter II. Its commitment to ease of use as well as quality of output is underlined by the inclusion of the CG fonts and the amount of work which has gone into re-designing the menus.

The system of text entry, editing and layout makes it possible to emulate the design techniques used by professionals – *and* get similar results.

Although pitched at the same price point as the original PageSetter, PSII seems to be directed at the serious user as well as the hobbyist.

As an attempt to satisfy the needs of the semi-professional as well as the casual user, PageSetter II succeeds admirably. The only let down is the manual which, while it details all the available features, doesn't inform users about the type of situations they are likely to be used in or how they can combine with other features to produce specific effects.

Overall, in spite of a slight aura of instability surrounding some aspects of the software – like the way text sometimes appears horribly corrupted on the screen – PageSetter II is undoubtedly an excellent product, and well worth trading your granny in for. If I had just spent a large sum of money on a similar Mac system, I would have been very annoyed with myself.

Drawn to scale fonts

ONE of the features that puts PageSetter II in the top league of DTP packages is the implementation of Agfa's CompuGraphic (CG) fonts. A complete rundown on scaleable fonts and related subjects like Page Description Languages (PDL) is material for another article, however it would be wise to know what they can do for you.

When at last the work is done and it's queuing up to jump down the parallel cable, PSII steps in and mucks around with its CG fonts. Individual characters are constructed in memory and the page is sent to the printer in a number of "strips", depending on how complicated it is.

Unfortunately many users will have problems using the bigger fonts on a well-packed page. Because PSII needs chip ram for creating the images to send to the printer and because chip ram is one thing that nobody has enough of, inevitably problems arise.

The fault is usually in the form of letters being trimmed a bit, sometimes to the extent that over half the letter is missing.

Admittedly this was only discovered by printing out a 96 point, 16 character headline at 300 x 300 dots per inch (dps) resolution on a laser printer (itself with 1 meg on board), but it is still a worry because this is just the sort of setup that may be needed for some DTP purposes.

There is no way to solve the problem short of major surgery (fitting a fatter Agnus) or major layout re-design.

What's on the box?

DOUBLE clicking on any box on your page will bring up the Active Box requester. From here it is possible to change margins within the box and the absolute position of the box on the screen by entering numerical values. There are five special gadgets.

The Lock gadget, rather sensibly, prevents you from altering the box – moving it around, resizing it and so on – by accident, although it doesn't stop you entering or editing any text inside it. The lock is handy when involved pieces of your layout mean several overlapping boxes.

Two more gadgets control the priority of text on the screen. One will make the active box transparent or opaque – with the obvious effect that when an opaque box overlaps something, the something disappears and the other controls whether a box is impermeable. An impermeable box, where it overlays another box, forces the text in that box out of the intersection. Another term often used to describe this mode of behaviour is variable margins.

Unfortunately impermeability only applies to boxes, so it is not possible to flow text along the outside of, for argument's sake, a bit-mapped banana. Well, actually it is, but not this way. When it comes down to it, almost everything is possible, it's just a question of how badly you want to do it – in days, hours and minutes.

The QuickDraw option can also be found here. Selecting this gadget means that the current box will appear on screen as a crossed-out box – useful to cut the time of refreshes when you know it will not need to be changed.

Tints and bordered boxes are made possible by the last gadget here. Selecting this and setting the associated features in the Draw menu will allow a background tint of various tones – you can even design your own with the built-in editor.

REPORT CARD

PageSetter II
HB Marketing 0895 444433
£99.95

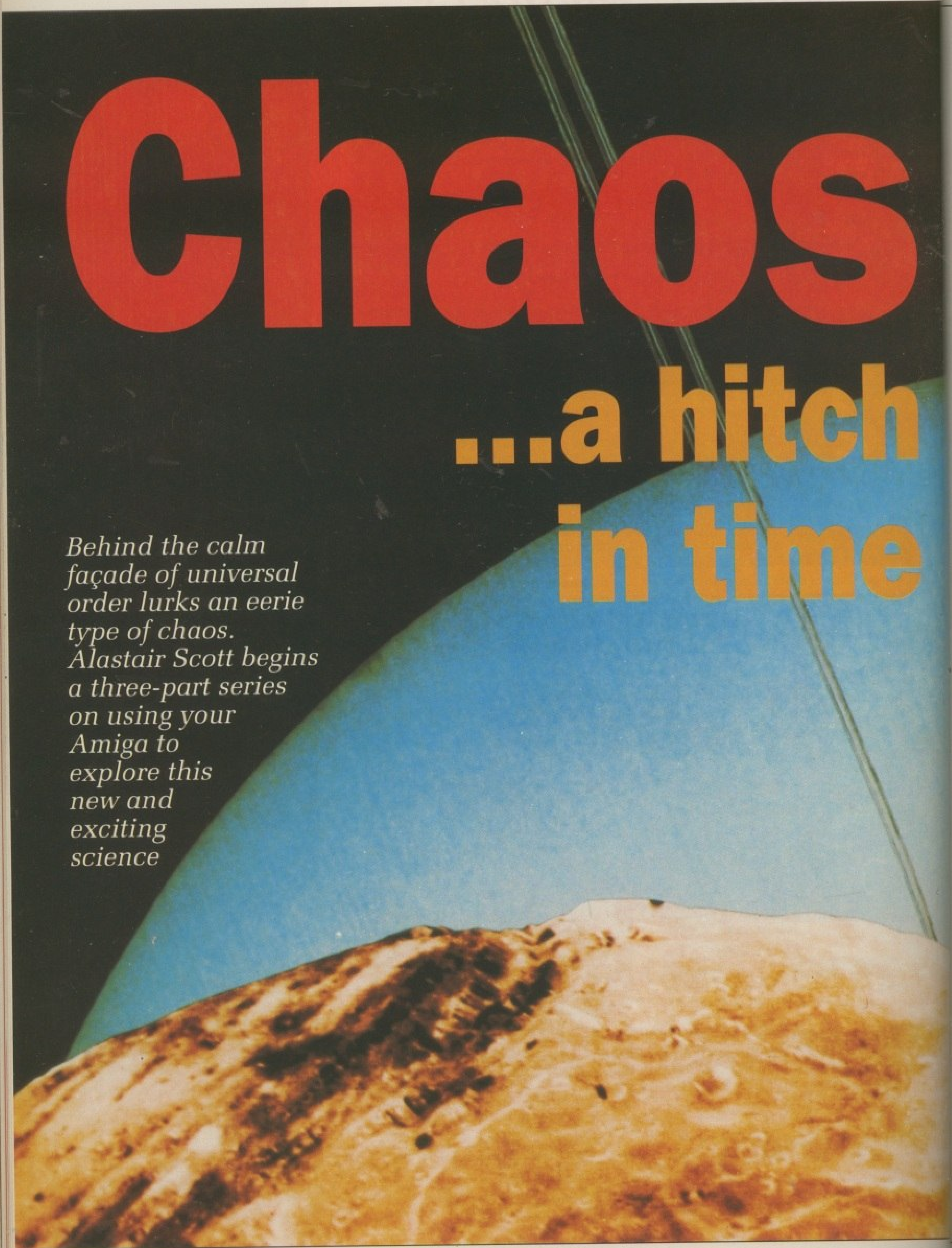
***EASE OF USE*....**
Incredibly easy to use. The manual could have been more explicit on the uses of features and not just their mechanics.

***SPEED*................**
Interruptable screen refresh cuts down on most of the boredom problems.

***VALUE*...............**
Remarkable. Needs 1 meg of ram, but compare the overall price to similar products running on a Mac and you'll want to buy several copies.

***OVERALL* 92%**

Just what the Amiga has been waiting for to firmly establish itself as the poor man's Mac.



Chaos

...a hitch in time

Behind the calm façade of universal order lurks an eerie type of chaos. Alastair Scott begins a three-part series on using your Amiga to explore this new and exciting science

WHAT is chaos, and why are lots of people writing about it? Instead of answering the question directly, let me first introduce you to two contradictory views which demonstrate a huge upheaval in how scientists understood the world.

In 1776 the French mathematician Pierre Simon Laplace said: *"Suppose there is an intelligence which knows the relation between every body in the universe at a given time. It could state the relative positions, motions and effects of these bodies at any time in the past or future."*

This quotation is taken from his *Mécanique Celeste*, a gigantic mathematical exposition of the world as first described in Newton's Principia of 1687.

According to Newton, the world was deterministic – you could run it backwards and forwards via a straightjacket of equations which allowed nothing untoward to happen. Philosophers and writers, especially William Blake and Jonathan Swift, disliked this because God seemed to be reduced to a passive onlooker as the wheels of time ground slowly on and on.

The first cracks in the Newtonian edifice appeared in the nineteenth century with the development of the kinetic theory of gases. According to this theory, a gas is a system of countless indistinguishable particles.

Because there is no way of telling one from another you have to introduce averages and probabilities to describe the behaviour of the gas. You can only say that it is most probably in a certain state – it may be in any state, although the probability of being in unlikely states is incredibly small.

When you pour boiling water into a cold mug, it may freeze – because each water molecule can exist in several states, one of them being ice. This could happen with your next mug of coffee or just before the collapse of the Universe, there is no way of predicting when.

The probability of such an unlikely event has been calculated. It turns out to be the second largest number in physics. This number, written with one character per centimetre, would stretch across the observable universe many times.

By the 1890s, Jules Henri Poincaré, building on the mathematical work of Rayleigh, had found that many systems which seemed deterministic actually gave random, unpredictable results – even supposedly safe Newtonian ones. In the year 1903 he said: "... it may happen that small differences in the initial conditions produce very great ones in the final phenomena ... prediction becomes impossible." This is chaos, which Poincaré called "the fortuitous phenomenon", and here are its signs:

● Even if the system seems orderly, you may get completely random results which cannot be predicted.
● Change the initial conditions slightly and the final result is enormously different.

Listing I simulates a Newtonian system which Poincaré studied. It consists of two different fixed masses and a tiny third mass orbiting, rather like a double star with a planet, except that the larger masses would normally be orbiting around each other. Only gravitational forces between the masses are considered.

The planet's path is plotted, then its initial velocity is changed by one part in ten million and the path is calculated again. Sometimes the paths are identical, other times they are completely different – there is no way of telling which will occur for a given run, and both of the conditions of chaos are satisfied.

If you try a few times, you should see that the closer the planet eventually passes to one of the stars, the bigger the difference. Why? Newton's law of gravitation states that gravitational force is inversely proportional to the square of the distance between the planet and the star. If you have two very small and

➤

```
'
'Solves the restricted 3-body problem
'
  SCREEN 1,640,256,3,2
  WINDOW 1,"The Three Body Problem",(
0,0)-(631,242),0,1
  RANDOMIZE TIMER
  PALETTE 0,0,0,0
  PALETTE 1,.33,.33,.33
  PALETTE 2,1,1,1
  PALETTE 3,0,.8,.4
  PALETTE 4,0,.4,.2
  PALETTE 5,1,.53,0
  FOR a=1 TO 4:MENU a,0,0,"":NEXT
  DEFINT a-c:DEFDBL d-z
  DIM SHARED x(2),y(2),mass(2)
  DIM SHARED xvelocity(2),yvelocity(2
),xaccel(2),yaccel(2)
  counter=400
  mass0=4#+RND*4#
  mass1=4#+RND*4#
  x=RND*4#*SGN(RND-.5#)
  y=RND*4#*SGN(RND-.5#)
  GetParams mass0,mass1,x,y
  CLS:COLOR 2
  PRINT USING"Masses are ##.#### and
##.####";mass0*10,mass1*10
  ShowBinary
  PlotOrbit 3
  GetParams mass0,mass1,x,y
  xvelocity(2)=xvelocity(2)+.0000005#
  yvelocity(2)=yvelocity(2)+.0000005#
  PlotOrbit 4
  ShowBinary
  LOCATE 30,1
  PRINT"Press mouse button to return
to Basic";
  WHILE NOT MOUSE(0):WEND
  MENU RESET
  WINDOW CLOSE 1
  SCREEN CLOSE 1
  END
SUB GetParams(m0,m1,x0,y0)STATIC
  x(0)=3#:x(1)=-3#:x(2)=x0
  y(0)=0#:y(1)=0#:y(2)=y0
  mass(0)=m0:mass(1)=m1:mass(2)=.1#
  xvelocity(2)=.08#:yvelocity(2)=.08#
END SUB
SUB PlotOrbit(colour)STATIC
  SHARED counter
  FOR a=0 TO counter
    xaccel(2)=0#
    yaccel(2)=0#
    FOR b=0 TO 1
      deltax=x(2)-x(b)
      deltay=y(2)-y(b)
      distance=deltax*deltax+deltay*d
eltay
      force=mass(2)*mass(b)/(10#*dist
ance)
      xaccel(2)=xaccel(2)-force*delta
x
      yaccel(2)=yaccel(2)-force*delta
y
    NEXT
    xvelocity(2)=xvelocity(2)+xaccel(
2)
    yvelocity(2)=yvelocity(2)+yaccel(
2)
    x(2)=x(2)+xvelocity(2)
    y(2)=y(2)+yvelocity(2)
    IF a=0 THEN
      PRESET(320+20*x(2),128+10*y(2))
    ELSE
      LINE-(320+20*x(2),128+10*y(2)),
colour
    END IF
  NEXT
  LINE(318+20*x(2),127+10*y(2))-STEP(
4,2),2,bf
END SUB
SUB ShowBinary STATIC
  FOR a=258 TO 378 STEP 120
    CIRCLE(a,127),4,5,,,.5
    PAINT(a,127),5
  NEXT
END SUB
```

Listing I

➤

slightly different distances, their inverse squares are large and very different, hence the big differences in the orbits, which are magnified each time the planet makes a close approach. You don't believe me? Try working out some inverse squares using a calculator.

Suspicious people may think that these effects can be explained by rounding errors in the Amiga's arithmetic. As usual, Nature is too clever – it doesn't matter whether there are rounding errors or not, because chaos doesn't care. Another suspicion: Can planets and stars be approximated by point masses, as the program does? Yes, as Newton showed.

That was a small subset of a problem which caused much head scratching over the years – the N-body problem. Put *N* masses anywhere in space and make them interact via gravitational forces only. How do they move? Can you predict their motion?

Newton solved N=2 in Principia, and Lagrange, a contemporary of Laplace, believed he had solved N=3 with the conditions above, the restricted three-body problem. Unfortunately for clockwork thinkers, Poincaré came along, showed that Laplace was wrong and that anything with N>2 was also insoluble. So the answers to my questions are 1) Don't know, and 2) No.

Now by "insoluble" I mean that you can't write down the solution to the gravitational equations as a formula, even if your writing paper exhausted the forests of the world and your pen used all the Indian ink in India – the jargon term is "inexpressible as an analytic solution", or some such gobbledygook. However, you *can* solve them numerically, and Listing II does this for *N* between 2 and 20. Masses, positions and velocities are assigned randomly to save you typing in lots of numbers.

With N=2 you get some strange looking yellow and red paths. They look much more familiar if you imagine the yellow path as that of the Sun, the red path as that of a comet, and select the Body Frame option from the menu. This redraws the scene as if the Sun were stationary with the comet moving round it – you should see elliptical orbits.

If the comet keeps coming too close to the Sun it may be thrown into a different orbit, or even shoot straight

➤

```
'
' Solves the N-body problem
'
  SCREEN 1,640,256,3,2
  WINDOW 1,"The N-Body Problem",(0,0)
-(631,242),0,1
  DEF FNrandom(x)=RND*x*SGN(RND-.5)
  RANDOMIZE TIMER
  PALETTE 0,0,0,0
  PALETTE 1,.33,.33,.33
  PALETTE 2,1,1,1
  PALETTE 3,1,1,0
  PALETTE 4,1,0,0
  PALETTE 5,0,1,0
  PALETTE 6,0,0,1
  PALETTE 7,0,1,1
  MENU 1,0,1,"Options"
  MENU 1,1,1,"   Magnify by 2   "
  MENU 1,2,1,"   Reduce  by 2   "
  MENU 1,3,2,"   Space frame    "
  MENU 1,4,1,"   Body frame     "
  MENU 1,5,1,"   Restart program"
  MENU 1,6,1,"   Quit program   "
  FOR a=2 TO 4:MENU a,0,0,"":NEXT
  ON MENU GOSUB choice
  MENU ON
  DEFINT a,b,e,n
  endflag=0
  frameflag=1
  scale=1
  COLOR 2
  INPUT"How many bodies? (2-20) ",nbo
dies
  CLS
  num=nbodies-1
  DIM SHARED x(num),y(num),mass(num)
  DIM SHARED xvelocity(num)
  DIM SHARED yvelocity(num)
  DIM SHARED xaccel(num),yaccel(num)
  DIM SHARED x2(num),y2(num)
  DIM SHARED mass2(num)
  DIM SHARED xvelocity2(num)
  DIM SHARED yvelocity2(num)
  FOR a=0 TO num
    x(a)=FNrandom(3)
    y(a)=FNrandom(3)
    xvelocity(a)=FNrandom(1)
    yvelocity(a)=FNrandom(1)
    mass(a)=RND*5
    x2(a)=x(a)
    y2(a)=y(a)
    xvelocity2(a)=xvelocity(a)
    yvelocity2(a)=yvelocity(a)
    mass2(a)=mass(a)
  NEXT
  WHILE NOT endflag
    FOR a=0 TO num
      xaccel(a)=0
      yaccel(a)=0
      FOR b=0 TO num
        IF a<060><062>b THEN
          deltax=x(a)-x(b)
          deltay=y(a)-y(b)
          distance=deltax*deltax+delt
ay*deltay
          force=mass(a)*mass(b)/(10*d
istance)
          xaccel(a)=xaccel(a)-force*d
eltax
          yaccel(a)=yaccel(a)-force*d
eltay
        END IF
      NEXT
    NEXT
    FOR a=0 TO num
      xvelocity(a)=xvelocity(a)+xacce
l(a)
      yvelocity(a)=yvelocity(a)+yacce
l(a)
      x(a)=x(a)+xvelocity(a)
      y(a)=y(a)+yvelocity(a)
      IF frameflag=1 THEN
        x=scale*x(a)
        y=scale*y(a)
      ELSE
        x=scale*(x(a)-x(0))
        y=scale*(y(a)-y(0))
      END IF
      PSET(320+2*x,128+y),3+(a MOD 5)
    NEXT
  WEND
  ERASE x,y,xvelocity,yvelocity
  ERASE xaccel,yaccel,mass
  ERASE x2,y2,xvelocity2,yvelocity2
  ERASE mass2
RUN

choice:
  item=MENU(1)
  IF item=1 THEN
    scale=scale*2:restart
  END IF
  IF item=2 THEN
    scale=scale/2:restart
  END IF
  IF item=3 THEN
    frameflag=1
    MENU 1,3,2:MENU 1,4,1:restart
  END IF
  IF item=4 THEN
    frameflag=2
    MENU 1,3,1:MENU 1,4,2:restart
  END IF
  IF item=5 THEN
    endflag=-1
  END IF
  IF item=6 THEN
    MENU RESET
    WINDOW CLOSE 1:SCREEN CLOSE 1
    END
  END IF
RETURN

SUB restart STATIC
  SHARED num
  FOR a=0 TO num
    x(a)=x2(a)
    y(a)=y2(a)
    xvelocity(a)=xvelocity2(a)
    yvelocity(a)=yvelocity2(a)
    mass(a)=mass2(a)
    xaccel(a)=0
    yaccel(a)=0
  NEXT
  CLS
END SUB
```

Listing II

➤

out of the Solar System. This celestial billiards effect is used when transferring spacecraft into different orbits using the gravitational field of Venus or Jupiter as a slingshot. Notice that the orbit is always smooth, it never has any strange kinks and twists.

With N=3 you do get peculiar looking orbits, and you can see why solutions cannot exist – there is no way you could express such peculiar orbits in the form of the nice smooth mathematical functions you get in text books. Once again, chaos has turned up.

With N greater than 4 or 5 the orbits become so complicated it is difficult to follow them on screen. With N in the hundreds, even supercomputers are struggling: N bodies require approximately N^2 operations to calculate one step of each orbit, so computer time increases geometrically as N increases arithmetically.

This is a serious problem known as NP-completeness which hampers simulation of large systems in many branches of computational physics. Much work is being done to get round the problem by devising new lines of attack which need less operations per time step. One success lies with the sorting of an array of numbers. You will probably have used the simple bubble sort, which is about the slowest imaginable; computer science books will give others, such as the insertion and shell sorts, which are much faster for big arrays.

Incidentally, Einstein showed that the Newtonian edifice was but a brick in a much grander construction – you can easily show that Newton's theory is a special case of Einstein's relativistic theory. Don't worry too much, Newton's theories are perfect for most problems, but big distances and/or high velocities and energies, as found in astronomy and particle physics, require relativity.

```
'
' Simulates a Galton board
'
  SCREEN 1,320,256,3,1
  WINDOW 1,"The Galton Board",(0,0)-(
311,242),20,1
  WINDOW 2,"Binomial?",(90,30)-(230,2
00),20,1
  RANDOMIZE TIMER
  PALETTE 0,0,0,0
  PALETTE 1,.33,.33,.33
  PALETTE 2,.67,.67,.67
  PALETTE 3,.17,.17,.17
  PALETTE 4,1,1,1
  MENU 1,0,1,"Options"
  MENU 1,1,1,"Quit program"
  ON MENU GOSUB choice
  MENU ON
  DEFINT a-z
  tries=0
  DIM SHARED ball(48)
  DIM SHARED binomial(20)
  DIM SHARED bottom(20)
  Graphic
  BottomDisplay
  FOR a=0 TO 18
    xcoord=158-a*8
    ycoord=16+a*8
    FOR b=0 TO a
      LINE(xcoord-1,ycoord-1)-STEP(2,
2),1,b
      PSET(xcoord,ycoord),2
      xcoord=xcoord+16
    NEXT
  NEXT
  WHILE TIMER
    COLOR 4
    LOCATE 1,1
    PRINT"Tries";tries
    deltax=0
    deltay=4
    xcoord=156
    ycoord=8
    goright=0
    WHILE ycoord<060>=200
      PUT(xcoord,ycoord),ball
      xold=xcoord
      yold=ycoord
      xcoord=xcoord+deltax
      ycoord=ycoord+deltay
      IF ycoord MOD 8=0 THEN
        IF ycoord<060>160 THEN
          deltax=4*SGN(RND-.5)
            IF deltax<062>0 THEN
              goright=goright+1
            END IF
        ELSE
          deltax=0
        END IF
      END IF
      PUT(xold,yold),ball
    WEND
    bottom(goright)=bottom(goright)+1
    binomial(goright)=binomial(gorigh
t)+1
    tries=tries+1
    IF bottom(goright)<062>12 THEN
      ERASE bottom
      DIM SHARED bottom(20)
      BottomDisplay
    ELSE
      ycoord=238-6*bottom(goright)
      PUT(xcoord,ycoord),ball
    END IF
    ShowGraph
  WEND

SUB ShowGraph STATIC
  WINDOW OUTPUT 2:CLS
  maxval=-1
  colour=2
  FOR a=0 TO 20
    IF binomial(a)<062>maxval THEN
      maxval=binomial(a)
    END IF
  NEXT
  scale!=154/maxval
  FOR a=0 TO 20
    LINE(8*a,196)-STEP(7,-scale!*bino
mial(a)),colour,bf
    colour=6-colour
  NEXT
  WINDOW OUTPUT 1
END SUB

SUB Graphic STATIC
  WINDOW OUTPUT 1
  CIRCLE(4,4),2,4,,,1
  PAINT(4,4),4
  GET(2,2)-(6,6),ball
  CLS
END SUB

SUB BottomDisplay STATIC
  xcoord=6
  LINE(0,164)-STEP(320,76),0,bf
  FOR a=0 TO 19
   LINE(xcoord-1,168)-STEP(2,70),3,bf
   xcoord=xcoord+16
  NEXT
END SUB

choice:
  MENU RESET
  WINDOW CLOSE 1
  WINDOW CLOSE 2
  SCREEN CLOSE 1
  END
```

THE final blow to Newton came with the discovery that probability has a fundamental rôle in quantum mechanics.

The last topic in this introduction to chaos is the Swiss army knife of physics – the Hamiltonian. Given any system of particles you can, in principle, write down a mathematical function called the Hamiltonian, which is usually a measure of the total energy of the system. Given the Hamiltonian, you can manipulate it to get equations of motion, then solve these equations to predict the behaviour of the system at any past or future time. This sounds dangerously Laplacian, so you should be expecting a catch somewhere. And there is – in

> *‘Einstein showed that the Newtonian edifice was but a brick in a much grander construction’*

almost every real case the Hamiltonian cannot be manipulated. These cases occur when it has sharp edges.

The Galton Board, an early pinball game found in many science museums and simulated in Listing III, demonstrates this. Consider a triangle made up of rows of nails driven into a board. Drop a metal ball bearing at the top of the triangle and let it bounce left or right at random off a nail in the next row. Where does it end up at the bottom of the board?

It is much more likely to end up near the centre than near the edges, as taking a simplified board with only four rows shows. In Figure I a dot is a nail and the number of ways the ball can reach that nail is displayed beside it. Check them.

So the ball has a one-in-eight chance of ending up at either of the outer nails, but a three-in-eight chance of ending up at one of the middle nails.

If you continue this analysis, Pascal's Triangle builds up row by row, the numbers given are binomial coefficients, and dropping lots of balls should give an approximation to the binomial distribution, with its characteristic central peak, as was Galton's intention. If you run Listing III, this distribution is plotted in the small window.

My mentioning probability should set alarm bells ringing – the system should not be deterministic. Indeed, if you try writing down a Hamiltonian for the ball's motion on the board, you get into a fine mess with nasty spikes, caused by the nails, everywhere.

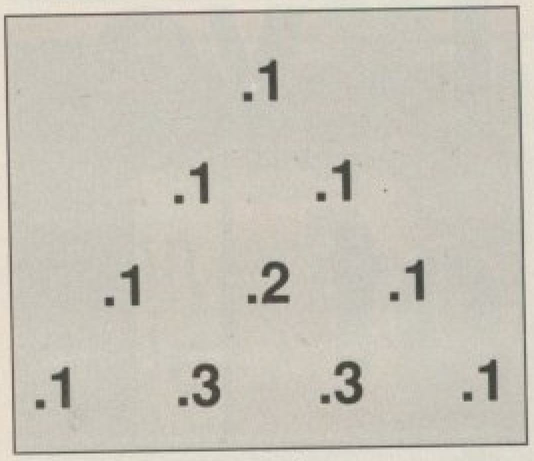


Figure I: A Galton Board

Spikes are bad news, only in the past 30 years have mathematicians gained even the slightest idea how to handle them, and in this case even they are stumped and the Hamiltonian cannot be manipulated.

You can drop a ball, but you cannot predict precisely where it will land. Even a couple of extra iron atoms in one of the nails could make the ball end up in a different place – chaos strikes again!

Hamilton could be Saint George slaying the dragon of NP-completeness. Instead of using positions and velocities as in Listings I and II, people have recently found that using a Hamilton special called the "action" to specify a body often leads to much quicker calculations. This demonstrates a common paradox – often the least obvious way of solving a problem turns out to be best.

● *NEXT MONTH: Everything you were never told at school about the pendulum, and why weather forecasting doesn't work very well.*

For the l♥ve of icons

Make your Workbench a thing of beauty. Jeff Walker explains how

ONE of the many advantages the Amiga has over its competitors is the versatility of Workbench. Thanks to some far-sighted programmers and developers, we can muck around with the way it looks and feels until the STs come home.

Preferences will let you change its colours, its resolution and the appearance of its pointer. There are public domain programs out there that will let you open more than one workbench, have an overscan Workbench and have an eight-colour Workbench, though these aren't of much practical use unless you have more than a meg of ram. A number of PD programs will cut the Workbench down to two colours for you, thereby saving about 21k of memory. Yet more PD programs will change the appearance of the gadgets and windows. The possibilities seem, and probably very nearly are, endless.

Ultimately, what makes your Workbench *yours* are the icons. Commodore supplies two tools on the Extras disc, IconEd and IconMerge, to edit and personalise your icons. Unfortunately both are extremely poor examples of their ilk. With the greatest respect to the authors of these two programs, who in their defence were certainly working to a hazy spec and ridiculous deadlines, the only thing I can recommend you to do with IconEd and IconMerge is delete them from your (copy of) Extras disc.

To play with icons properly you are going to need proper tools. If you're going to bore a hole in a piece of wood you use a drill. At a pinch, and if the wood is thin enough, you could get away with a screwdriver and a hammer, but it'll take you longer, the hole will be the wrong size and it won't end up exactly where you want it. So jobbers who take a pride in their work will use the proper tool, preferably an electric one.

There are a number of dedicated icon tools in the public domain – I use John Scheib's IconMaster. It has an adequate array of drawing tools, including brushes and the all important undo function. Regular readers will find IconMaster on the October 1989 cover disc (RIP). New readers can either avail themselves of a back issue or get hold of Fish Disk C023 from their favourite public domain distributor.

The trouble with creating icons is that most of us don't consider ourselves competent enough artists to accomplish the job. This is poppycock. Drawing is like writing – the first few paragraphs are the hardest, but once these are written the adrenalin starts pumping, the words begin to flow and you'll start to have more ideas than you know what to do with. So the trick is knowing how to start.

FOR the inexperienced but aspiring icon artist there are three ways to begin the job – someone else's artwork, clip art and existing icons.

Using someone else's artwork is a problem, firstly because it will almost certainly use more than four colours and secondly because IconMaster will only import the top left-hand corner of the screen. So you'll need to do some work on it; for this you'll need another tool, like DPaint III or Spritz, to cut out and save as a brush just the small part of the screen you're interested in. If it's a HAM screen you'll first need to use something like PIXmate to convert it from HAM to 16 colours.

Then you'll need to convert your brush to four colours, probably by hand because DPaint III, powerful as it is, will probably make a right pig's ear of the job. This is utterly forgivable because you really are asking the very highly improbable.

The ideal program for the job would take an 8, 16 or 32 colour screen or brush and convert every colour to a different black and white fill pattern. I often used a homegrown utility to do this when DTPing on my ageing Amstrad CPC6128, I have yet to find its equivalent on the Amiga – a fact which never ceases to amaze me.

Clip art can be gleaned from a number of places. There is precious little of it in the public domain, but a number of dealers sell discs crammed with it. In general the clip art on offer is of fairly poor quality, mostly ported from another computer or scanned in by one of these expensive hand scanner things.

It's not cheap, but it is usually two or four-colour (ask before you buy!) and for the non-artist clip art represents an easy starting point. Most of my early icons started life as clip art.

The least expensive way of personalising or creating new icons is to start with an existing one and play with it. Use IconMaster to give a second image to the Shell icon, make the printer in GraphicDump look more like the one you own – I mean, how many people have orange printers?

Public domain discs – or for that matter, the *Amiga Computing* cover discs – contain many excellent and amusing icons that will do as a starting point. If you own a modem you'll find that most Amiga bulletin boards contain archive files full of nothing but icons. All are fair game for alteration and improvement, although if you intend to distribute your icons via PD discs or modem you should be fair to the original artist and give credit where credit's due.

No matter how you begin the job, the art of creating good graphics in four colours is to deceive the eye into believing it is seeing more than four colours. We do this by using fill patterns. Most graphics artists use this

Getting the most from fill patterns

FLESH tones are hard to produce unless you're an expert at mixing colours. But when you've only got four colours to play with, the job is impossible. The best we can do is try to give the impression of flesh by using a fill pattern.

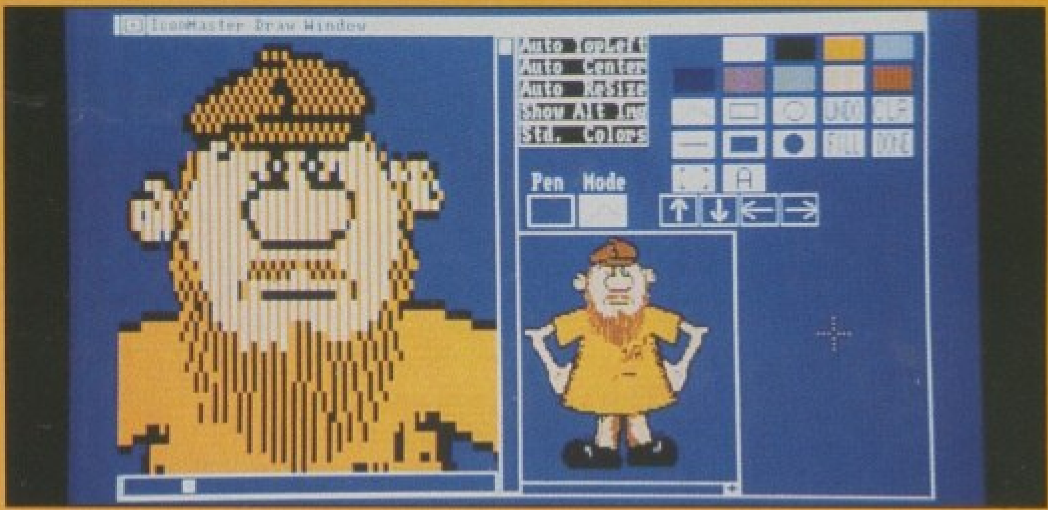
The close-up view of the Jeff icon reveals a few tricks. Flesh is represented, rather well I think, by orange and white vertical stripes. The medium brown of the moustache is achieved by a black and orange chequered pattern, while the lighter brown of the beard is composed of black and orange vertical stripes, some slightly offset to give a straggly effect.

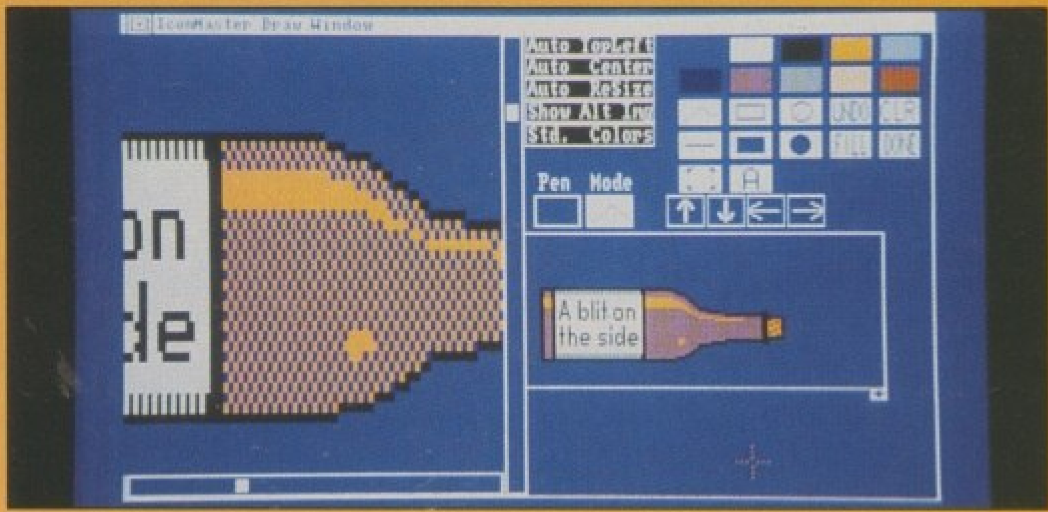
The Bottle icon shows how green can be simulated with blue and orange cheques.

Green is really created by mixing blue and yellow, but orange has a lot of yellow in it, so mixing blue and orange gives gives a greenish tint to the bottle. The fact that wine bottles are usually green adds to the illusion.

Note also the cunning use of short black strokes as shading on the white label to help convince the viewer that this bottle is a three-dimensional object.

Various weights of checks and stripes will render various shades of colours, although the wider the stripe and the larger the cheque, the more obvious the pattern will be. This isn't necessarily a bad thing. Despite the pattern being obvious, it will still have a different tone to it. But remember that too many fill patterns in a graphic will confuse the eye. Less is more.





technique when designing sprites and backdrops for the 8 bit machines, which are short on memory. But even on their low resolution screens, these graphics work well enough. Ask any Spectrum owner.

Thanks to the high resolution of the Amiga workbench screen, fill patterns can be very deceptive. I have tricked people into seeing green, flesh, grey and various shades of blue and brown, as well as the four standard colours, all in the same icon. To be honest, I didn't trick them, they tricked themselves. Let me explain.

If you're drawing a graphic of Maggie Thatcher's face and use a close approximation to a flesh tone to colour it, then when someone looks at your graphic the colour they will see will be flesh – because that's the colour Mrs Thatcher's face normally is. Likewise, because wine bottles are normally green, if you draw a wine bottle and use a fill pattern that is as close to green as you can get, the viewer will convince himself that the bottle is green.

LIKE any eye deception, on closer inspection the illusion will be very quickly shattered. On the whole, the smaller the graphic, the longer the illusion will last.

This is an important point – large areas containing the same fill pattern will deceive the eye no longer than it takes to do a double take. Be subtle.

Of course, fill patterns aren't used exclusively for giving the impression of more colours. Sometimes you will want the pattern to be obvious, as in a striped apron for instance. In fact, using an obvious fill pattern in the graphic can add to the illusion of the not-so- obvious ones.

You will need to use other deceptions to give the illusion of perspective. The standard drawer icon uses one of these techniques to trick you into seeing a drawer opening when you click on it. For the non-artist this can be the most difficult aspect of drawing, no pun intended.

The secret is observation and experimentation. Look closely at the drawer icon – the Notepad icon is another good example – to see how it is done. Use *Edit Image : Primary Image* and *Edit Image : Secondary Image* in IconMaster to take an even closer look. From here you'll be able to investigate the technique at pixel level.

Take notes, make pencil sketches ➤

Perspective and shade

FOR small icons, just a hint of perspective is usually enough to get the desired effect. Study the legs of the ram chip. In close-up you can see that they look like nothing more than funny shaped white blobs, yet in the normal sized icons they are clearly the legs of the chip.

This is mainly because our brains know that chips have legs, so it makes us see those white bits as what it knows they look like. But any old blob won't satisfy – it has to be thought about. Notice the angle of each leg, about 45 degrees, and notice how each leg gets thinner. This is one way to create the illusion of perspective.

We feel we are viewing the graphic from the right and from above. If the legs were drawn pointing down instead of up, the perspective changes to below the graphic.

This icon would undoubtedly survive without the legs, but it's little touches like this that turn good icons into great ones.

Shading is easier than perspective, especially in small graphics. A large-ish black area is usually enough to give the impression that a part of the graphic is in the shade. The tree icon shows this technique very well. The whole of the left hand side of the tree trunk is in the shade, and so is the branch at top left. The trick is to visualise where the sunlight is coming from and then decide which parts of your graphics would be thrown into shadow. On a small icon, this alone is enough to create an illusion of perspective, but a larger one needs more thought.

The broken offset lines running down the trunk give the impression of bark, and it's these that ultimately make that tree look "round".

The textures of the leaves on the tree and the grass on the ground also add to the perspective. Each was achieved by first creating a brush, then painting with it.

The leaves brush was just a random mixture of black and orange pixels, with a little white highlights thrown in to try to create the illusion of sunlight sparkling off shiny leaves. The brush was about a quarter-of-an-inch square on the screen. I used DPaint III to paint on the foliage with great circular sweeps of the mouse, but you could just as well use IconMaster to pick up the brush and plant it all over the top of the tree.

The grass was done in a similar manner, except that random orange and black lines were used, at various grass-like angles, instead of single pixels. White was used sparingly again, for the same reasons. The brush ended up about a quarter of an inch wide by half an inch high and looked like a little clump of grass, wider and less dense at the top than at the bottom – sort of V shaped.

I didn't paint the grass on, because this would have blurred it. Instead I planted it, tussock by tussock. After a while I saved time by picking up a group of tussocks and planting those.

The whole graphic comes across to me as a warm, sunny day in early autumn. Had I used blue and orange instead of black and orange, the season would have changed to summer or, by adding a few daffodils, spring.

Shading is all about observation. Look around you, there are shadows everywhere. Study how they fall across objects. Notice how they climb up the sides of things and then change direction when they get to the top surface.

Do you see how some shadows are darker than others? Take care also to study reflections. These are the opposite of shadows and need to be included in your graphic by using subtle light-coloured highlights.

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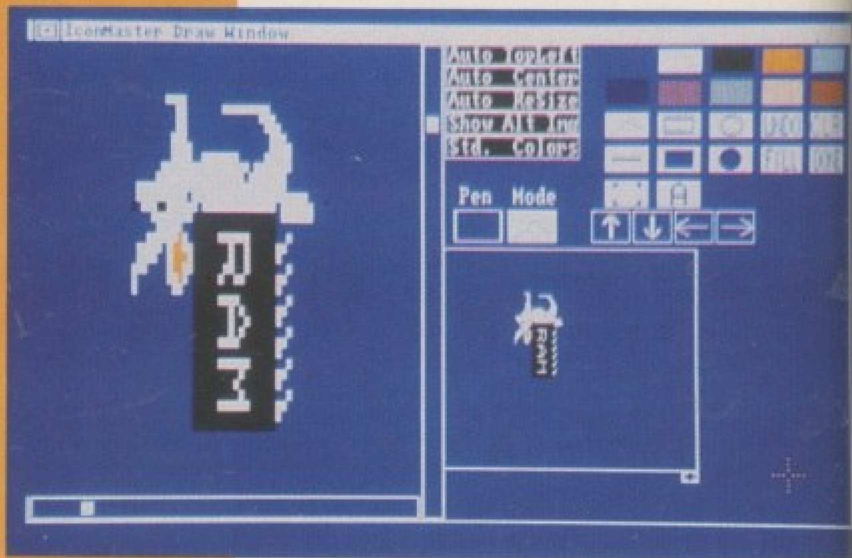
and then clear out the icon and try to draw it for yourself from scratch. Don't worry about the decorations too much, getting the perspective correct is more important here.

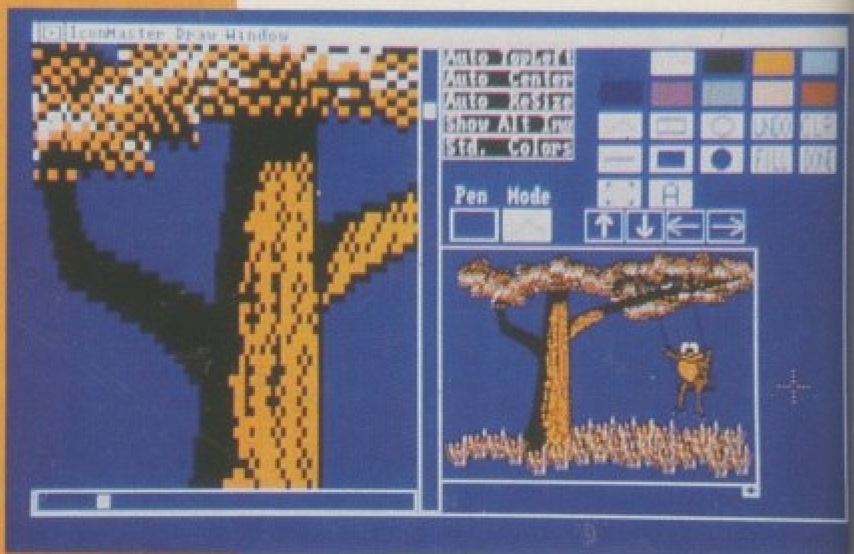
Another difficult technique to master is shading. Again, study some examples. Think about where the light is coming from and which parts of your drawing will be in the shade. The Protext Wordprocessor icon on the December cover disc is a good example.

On the same disc, the Workbench 1.3.2 icon shows how to use a shadow to give your graphic a feeling of depth.

This shadow was created with DPaint III. I cut out the insect as a brush, clicked on black for the foreground colour and selected *Color* from the Mode menu – this made a silhouette of the whole graphic – then used the perspective option to "lay" the brush down backwards as if it was flat on the ground, and *Brush : Rotate : Shear* to angle it as if the light source was coming from top left.

Lastly I used a black and blue





stipple pattern to lighten up the colour and fray the edges in an attempt to replicate that wishy-washy look that shadows have.

Luckily, much clip art comes ready shaded – all you need to do is touch it up a bit and add a bit of colour. In fact, this is a very good way to get to grips with the shading technique and learn about drawing in general, in much the same way that typing-in Basic or C listings helps you to learn to program in those languages by getting you used to the keywords and syntax.

To get good at any artform – be it music, acting, drawing, painting, writing or whatever – you need to have supreme confidence in yourself and practise regularly. You mustn't get disheartened by what others regard as failures.

William Golding, who won the Nobel Prize for Literature in 1983, was 43 years old before he saw his first novel, which had been rejected by umpteen publishers, in print.

Lord of the Flies is now compulsory reading in the British school curriculum.

The icon builder's toolkit

IconMaster *Essential. My favourite icon editor. Available on Fish Disk C023 or the Amiga Computing cover disc for October 1989.*

DPaint III *Highly recommended. The best Amiga graphics package. Available from any reputable Amiga dealer or mail order firm. DPaint II owners can get a low cost upgrade from Electronic Arts.*

Icons *Recommended. Every old icon represents a potential new one. Modem owners should check out their local BBS for archive files containing nothing but public domain icons. Non-modem owners should find a modem-owning Amiga user for a friend. Get yourself down the local computer club.*

Spritz *Optional. Selling for as little as £10 these days, Spritz is well worth the price and fine for the casual artist. It doesn't contain most of the advanced, time-saving features of DPaint III but knows about brushes and does have special features for loading, editing and saving icons.*

PIXmate *Optional. Image manipulator extraordinaire, PIXmate is a way of converting HAM images into something DPaint III or Spritz can understand. IconMaster will load HAM images, but the results are messy.*

Clip art *Optional, or recommended if you can get it for next to nothing. Commercial offerings are expensive and, frankly, a complete waste of money. Hassle every public domain distributor in the book until you find some. Modem owners should call their local BBS and do searches for "art" and "clip" in the files area.*

The only game in town

Mike O'Reilly uses AmigaBasic to create a multi-tasking Workbench toy

SOLITAIRE is a small workbench implementation of the classic puzzle game. It is fully compatible with the multi-tasking operating system, so it can be played while a disc is being formatted or a file is being printed – yes, Solitaire is a Workbench toy written in AmigaBasic!

The aim of the game is to finish up with a single peg in the centre hole. A peg is removed from the board when an adjacent peg jumps over it into a vacant hole.

To make a move, first click on the peg with which you intend to make a jump. These may only take place horizontally or vertically – not diagonally – over one peg only, into a hole on the other side. If such a move is possible with the selected peg, the selected peg is highlighted.

Next click on the target hole and the jump is performed, with the peg which has been jumped over being removed. Only valid moves are accepted. If, having highlighted a peg, you wish to change your selection, click on another valid peg and the highlight changes.

The game finishes when there is no possible jump left – no peg will highlight when clicked.

Click on the Play button to reset the board, click on the close gadget to end. Solitaire is a very simple game, but quite tricky to finish.

The listing is fully commented, making it easy for you to change things and experiment with the subroutines and subprograms. Owners of HiSoft's Basic Compiler will find comments in the listing suggesting a couple of changes that should be made before you compile it.

```
'
' Workbench Solitaire by Mike O'Reilly.
' © Copyright 1990 Amiga Computing.
'
' Defeat initial window for
' HiSoft Basic Compiler users.
'
REM $OPTION Y+
'
  DEFINT a-z
'
' The 9x9 array Peg() holds a colour
' value for each place on the board,
' including the borders:
'
' 0=Blue, 1=White, 2=Black, 3=Orange.
'
  DIM Peg(8,8)
'
' Assign a colour value to each
' possible state of a board square.
'
  Empty=0
  Highlight=1
  Board=2
  Full=3
'
' Open Window on the workbench screen
' (screen-id = -1). Using a window-id
' of 1 causes the program to resize
' the AmigaBASIC window and use it as
' its own window. Thus, clicking on
' the close gadget also ends Basic.
'
  WINDOW 1,"Solitaire",(10,50)-(262,1
80),2+4+8+16,-1
'
' Draw board and two gadgets.
'
  COLOR 1,0:LOCATE 15,8
  PRINT "About        Play!"
'
' Box for About
  LINE (50,110)-(100,120),,B
'
' Box for Play!
  LINE (147,110)-(197,120),,B
'
' Solid box for the board.
  LINE (16,8)-(236,98),2,BF
'
' Board setup routine.
  GOSUB Initialisation
'
' Main loop. Wait for a mouse click.
  Hold=1
  WHILE Hold=1
'   Specify Mouse subroutine.
    ON MOUSE GOSUB Mouse.Handler
'   Enable mouse checks.
    MOUSE ON
  WEND
END

' Set up the initial state of the
' board and draw the pegs.
' The variable "Flag" indicates
' whether player has highlighted
' a peg to be moved.
'
Initialisation:
  Flag=0
  FOR Row=0 TO 8
    FOR Column=0 TO 8
      Peg(Column,Row)=Board
    NEXT Column
  NEXT Row
'
' Place pegs in appropriate
' starting positions.
'
  FOR Column=3 TO 5
    FOR Row=1 TO 7
      Peg(Column,Row)=Full
    NEXT Row
  NEXT Column
'
  FOR Column=1 TO 7
    FOR Row=3 TO 5
      Peg(Column,Row)=Full
    NEXT Row
  NEXT Column
'
  Peg(4,4)=Empty ' Middle hole vacant
'
' Draw pegs and hole.
'
  FOR Row=1 TO 7
    FOR Column=1 TO 7
      CALL Colour(Column,Row)
    NEXT Column
```

➤

```
  NEXT Row
RETURN

' Mouse routine to determine where a
' click occurred and act accordingly.
'
Mouse.Handler:
'
' Read x and y coordinates of
' point clicked on.
'
  Test=MOUSE(0):x=MOUSE(1):y=MOUSE(2)

' If click occurred on Play! then
' reset board.
'
  IF x>149 AND x<201 AND y>112 AND y<
122 THEN
    GOSUB Initialisation
    RETURN
  END IF
'
' If it occurred on About then
' show credit window.
'
  IF x>50 AND x<104 AND y>112 AND y<1
22 THEN
    GOSUB About
    RETURN
  END IF
'
' Did click occur on the board?
'
  IF x<40 OR x>220 OR y<20 OR y>89 TH
EN RETURN

' If so, calculate which row and
' column of the board (9x9).
'
  Column=INT((x-40)/20)
  Row=INT((y-20)/10)+1
'
' Is the square of the board
' selected part of the border?
'
  IF Peg(Column,Row)=Board THEN RETUR
N
'
' A click has occurred on a peg
' position (i.e. a peg or an empty
' hole) so we can continue.
'
' A peg is not presently highlighted.
'
  IF Flag=0 THEN GOSUB First.Click
'
' A peg is presently highlighted.
'
  IF Flag=1 THEN GOSUB Second.Click
'
RETURN

' This subroutine is carried out if a
' peg is not highlighted. If a valid
' move can be made with the peg
' clicked on, then it is highlighted.

First.Click:
  Valid=0
'
' Was a peg clicked on?
'
  IF Peg(Column,Row)<>Full THEN RETUR
N
'
' Is a valid move possible
' with the peg?
'
  GOSUB Check.For.Legal.Move
'
' If so, then highlight it.
'
  IF Valid=1 THEN
    Peg(Column,Row)=Highlight
    CALL Colour(Column,Row)
    Highcolumn=Column 'Remember which
    Highrow=Row  'peg is highlighted.
    Flag=1
  END IF
RETURN

' This subroutine is called if a peg
' is currently highlighted. It checks
' to see if a valid jump can be made
' by the highlighted peg to the hole
' clicked on. If so it carries out
' the move. If another valid peg was
' clicked on then the highlight is
' changed.

Second.Click:
'
' Vacant hole or alternative
' peg not clicked on?
'
  IF Peg(Column,Row)=Board THEN RETUR
N
  IF Peg(Column,Row)=Highlight THEN R
ETURN
'
  IF Peg(Column,Row)=Empty THEN
'
'   Move down.
'
    IF Row=Highrow+2 AND Column=Highc
olumn AND Peg(Column,Highrow+1)=Full
THEN
      Peg(Column,Highrow)=Empty
      CALL Colour(Column,Highrow)
      Peg(Column,Row)=Full
      CALL Colour(Column,Row)
      Peg(Column,Highrow+1)=Empty
      CALL Colour(Column,Highrow+1)
      Flag=0
      RETURN
    END IF
'
'   Move up.
'
    IF Row=Highrow-2 AND Column=Highc
olumn AND Peg(Column,Highrow-1)=Full
THEN
      Peg(Column,Highrow)=Empty
      CALL Colour(Column,Highrow)
      Peg(Column,Row)=Full
      CALL Colour(Column,Row)
      Peg(Column,Highrow-1)=Empty
      CALL Colour(Column,Highrow-1)
      Flag=0
      RETURN
    END IF
'
'   Move right.
'
    IF Column=Highcolumn+2 AND Row=Hi
ghrow AND Peg(Highcolumn+1,Row)=Full
THEN
      Peg(Highcolumn,Row)=Empty
      CALL Colour(Highcolumn,Row)
      Peg(Column,Row)=Full
      CALL Colour(Column,Row)
      Peg(Highcolumn+1,Row)=Empty
      CALL Colour(Highcolumn+1,Row)
      Flag=0
      RETURN
    END IF
'
'   Move left.
'
    IF Column=Highcolumn-2 AND Row=Hi
ghrow AND Peg(Highcolumn-1,Row)=Full
THEN
      Peg(Highcolumn,Row)=Empty
      CALL Colour(Highcolumn,Row)
      Peg(Column,Row)=Full
      CALL Colour(Column,Row)
      Peg(Highcolumn-1,Row)=Empty
      CALL Colour(Highcolumn-1,Row)
      Flag=0
      RETURN
    END IF
  END IF
'
' Decide whether to change highlight
' to a different peg.
'
  Valid=0
'
' Valid peg?
'
  IF Peg(Column,Row)=Full THEN
    GOSUB Check.For.Legal.Move
  END IF
'
' If so then change highlight.
'
  IF Valid=1 THEN
    Peg(Highcolumn,Highrow)=Full
    CALL Colour(Highcolumn,Highrow)
    Peg(Column,Row)=Highlight
    CALL Colour(Column,Row)
'   Remember new highlight peg.
    Highcolumn=Column:Highrow=Row
  END IF
RETURN

' Subprogram to colour a peg position
' its appropriate colour (empty, full
' or highlight). It draws a rectangle
' at (Column,Row) in the colour
' contained in Peg(Column,Row).
'
SUB Colour(Column,Row) STATIC
' Peg is a global variable.
  SHARED Peg()
  x=46+Column*20:y=13+Row*10
' Draw rectangle.
  LINE (x-5,y-3)-(x+5,y+3),Peg(Column
,Row),BF
END SUB

' Subroutine to check if a valid move
' can be made by the selected peg. If
' so, set Valid flag = 1.

Check.For.Legal.Move:
'
' Check for up move.
'
  IF Row=1 THEN GOTO Down
  IF (Peg(Column,Row-1)=Full OR Peg(C
olumn,Row-1)=Highlight) THEN
    IF Peg(Column,Row-2)=Empty THEN
      Valid=1
    END IF
  END IF
'
' Check for down move.
'
Down:
  IF Row=7 THEN GOTO Left
  IF (Peg(Column,Row+1)=Full OR Peg(C
olumn,ROW+1)=HIGHLIGHT) THEN
    IF Peg(Column,Row+2)=Empty THEN
      Valid=1
    END IF
  END IF
'
' Check for left move.
```

```
➤
'
Left:
  IF Column=1 THEN GOTO Right
  IF (Peg(Column-1,Row)=Full OR Peg(C
olumn-1,Row)=Highlight) THEN
    IF Peg(Column-2,Row)=Empty THEN
      Valid=1
    END IF
  END IF
'
' Check for right move.
'
Right:
  IF Column=7 THEN GOTO No.Move
  IF (Peg(Column+1,Row)=Full OR Peg(C
olumn+1,Row)=Highlight) THEN
    IF Peg(Column+2,Row)=Empty THEN
      Valid=1
    END IF
  END IF
No.Move:
RETURN

' Credits and short instructions.
'
About:
'
' Disable mouse until window is drawn.
'
  MOUSE OFF
'
' If compiling with HiSoft Basic use
' 162 instead of 152 in next line.
'
' Open a gadgetless window.
'
  WINDOW 3,,(0,0)-(300,152),16,-1
  COLOR 2,1:CLS:LOCATE 2,1
  PRINT "          Workbench Solitair
e"
  PRINT
  PRINT "   Mike O'Reilly       Writ
ten in"
  PRINT "   Salthill Galway      Amig
aBASIC"
  PRINT "   '1990 Copyright Amiga Com
puting "
  PRINT "                     "
  PRINT "  The aim of the game is to
finish"
  PRINT "  up with only one peg remai
ning in "
  PRINT "  the centre hole. A peg is
removed "
  PRINT "  when another adjacent peg
jumps "
  PRINT "  horizontally or vertically
 over"
  PRINT "  it into a vacant hole. Per
form a"
  PRINT "  jump by clicking on the pe
g to "
  PRINT "  move and then the target h
ole."
  PRINT "  A new game can be begun at
 any "
  PRINT "  time by clicking on PLAY!.
"
  PRINT
  PRINT "                   OK!"
'
' Box for OK!
'
  LINE (117,142)-(157,152),2,B
'
  Delay=1
'
' Redirect mouse checks to new s/r.
'
  ON MOUSE GOSUB Mouse.Wait
'
' Re-enable mouse event checks.
'
  MOUSE ON
'
' Wait for OK! to be clicked.
'
  WHILE Delay=1:WEND
'
  WINDOW CLOSE 3
RETURN

' Mouse routine to check for
' OK! to be clicked.
'
Mouse.Wait:
  Test=MOUSE(0):x=MOUSE(1):y=MOUSE(2)
'
' Did mouse click occur
' within OK! rectangle?
'
  IF x>117 AND x<160 AND y>142 AND y<
152 THEN Delay=0
RETURN
```

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Nic Veitch investigates just how many typefaces one man needs with Star's XB24 printer



Overflowing fonts

DO you have a good imagination? Right. Just imagine, if you will, that you have a large block of plastic, say 451 x 341 x 139 mm.

Now heat it up until it is on the hot side of tepid and put it in a wind tunnel. If you scoop out the insides you have your own DIY case for a Star XB24-10.

Ergonomics are all very well, but you can go too far. Mind you, all these rounded edges and sculpted front panels make a relief against the stark, hard horizontals and verticals of most office appliances.

It is even in a particular shade of off-white which almost, but not quite, matches your Commodore kit – at least it does after being covered in journalistic grime. Well nobody's going to see it at the back of the desk covered in magazines anyway.

After unpacking and removing the obligatory three pieces of expanded polystyrene (Oh! there's only two) the first thing you must do to one of these printers is put a piece of paper in and press the feed button. Motors whir, lights flash and your page is parked automatically. That's what you pay money for.

The front-panel overflows with stuff. Five buttons and 19 LEDs, which are mostly connected to the surprising number of fonts.

There are 15 letter quality fonts, though one of these doesn't really count as it is a representation of the Code 39 bar-coding system.

Only seven fonts can be obtained using the button on the printer itself, the rest will have to be prised out with cunning use of escape codes. A shame, since fonts like Blippo and Orator are a lot more useful than some of the ones on the panel, Script for example.

Two of the fonts are also available in super letter quality. This should obviously be reserved for writing super letters like ones to President Gobblechops or your bank manager. When SLQ is activated the little green light on the front panel changes into a little red light to let you know that something devastating is about to happen. What is happening is the XB

is entering its cunning 48-pin emulation mode. Two fonts are available in SLQ mode: Times and TW- Light. Times is of course the elegant, serifed stalwart of the printed word.

TW-Light is rather similar but of a lighter weight and with big serifs. In fact only the SLQ mode gives it the definition to stop it from disappearing completely.

Dot matrix printers may never quite match the quality of a laser but with output this clear and precise most people would be hard pushed to tell the difference.

If that still isn't enough for you by way of fonts then you can download to the internal memory. With no extra memory card you can download a font and still have a 12k buffer.

Speedwise the XB is looking good with a draft (pica) rate of 200 cps and for LQ (pica), just a shade slower than the Epson LQ-850, although considerably quieter. In fact the XB has a quiet mode – actually just a switch to turn off bi-directional printing – which enables the user to work at the same desk and remain sane.

Being a Star there is no problem in setting the printer to Epson compatibility and running it happily from Workbench under the Epson driver. Preferences is also the place to set colour printing on if you have the optional extra noise, sorry, colour kit.

The kit is incredibly easy to install – pop out the ribbon and lever up the plastic bit. Aha, that's where the other bit of polystyrene got to – whip it out and drop in the colour widget. It can only fit one way round. Put everything else back where you found it, load up with a colour ribbon and you're ready for business.

Using the colour kit and SimCity I printed a poster-sized map (six pages) which came out looking very good indeed. The ribbon had only slightly started to fade by the end, but the colours were still clear.

Access to any conceivably interesting area of the printer is fairly straightforward, the only exception being the tractor-feed. Star printers favour the sensible method of using a push-tractor (although a pull-tractor is an option).

This is all well and good, but in order to preserve the XB's contoured charm they have decided to hide it under a plastic cover. This, too, is fairly acceptable.

The problem is that in order to load some fanfold paper you have to remove the rear cover and to remove the rear cover you have to remove the front cover and to remove the front cover you need to take out the plastic single-sheet feeder. Dear oh dear – minus several million points for lack of intelligence.

Petty whinges aside, the XB is an all-round superhero of a printer, but at a price. For the average home user it is a bit flash. For the serious user flashness translates to convenience and it's worth looking at.

REPORT CARD

Star XB24-10
Approx £495
0494 471111
Star Micronics

EASE OF USE....
Only marred by the difficulty in changing paper types.

SOFTWARE ....
The XB24-10 is fully compatible with an Epson and so well supported by Workbench.

SPEED ....
Not excessively fast for a 24 pin but pleasing to the ear, especially in undirection mode.

VALUE ....
Not cheap. A bit flash for home users but generally well priced considering the features. Competitive against the Epson LQ850. Shop around.

OVERALL 83%

All you could want in a dot matrix. Great quality with the 48 pin emulation mode.

Terminal tricks

IN addition to the pitch, print mode and font, many other options regarding the setup of the printer can be carried out from the front-panel. To access these options turn off the printer and then turn it on again holding down the Set, Paper Feed and On-line buttons. You will then enter (cue strange music and special effects) the Memory switch zone.

From this moment on your printer starts acting weird and thinks it's a terminal. Menu options will be printed out and at the touch of relevant buttons the print-head will position itself under one of the headings.

By use of four of the buttons on the front panel you can step up and down through the menu changing all the default settings. Everything from whether zeros appear with a slash to the number of lines the paper will be fed forward from the top of the page when auto loading. You can set the default LQ font to be one of the internals not on the front-panel.

Using the XB's reverse feed capability at each option, it will go back and put an asterisk next to the option chosen. All this leads one to conclude that there is a great deal more intelligence at one end of the printer cable than at the other.

Unfortunately the language, character set and page length are still set by a DIP switch. With all these wonderful menu systems why do we have to go back to the primaeval chore of rooting around in the guts of the printer with a Bic?

Once more into the breach dear friends
Or close the wall up with our English dead
In peace there's nothing so becomes a man
As modest stillness and humility
But when the blast of war blows in our ears
Then imitate the action of the tiger
Stiffen the sinews, summon up the blood
Disguise fair nature with hard-favour'd rage
Then lend the eye a terrible aspect
Let it pry through the portage of the head
LIKE THE BRASS CANNON; LET THE BROW OVERWHELM IT
As fearfully as doth a galled rock.

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AM4

Grabbing a piece of the action

John Kennedy gets put down with AmigaBasic – and not before time some say

GET and PUT are the two most exciting commands available from AmigaBasic. As soon as a programmer brought up on 8 bit technology spies them, he is soon salivating with ideas.

The commands allow us to make the most of the Amiga's ability to move graphics around quickly. Both commands have a dual personality in AmigaBasic, referring to file handling as well as to graphics. In this article we will be using them in their graphics context, because this is more fun.

First a warning – GET and PUT are dangerous commands. AmigaBasic is not widely renowned for being robust, and commands such as GET and PUT will cause it to sail closer to the wind than normal.

It is therefore a good idea to get into the habit of constantly saving to disc (not ram!) any programs you are writing which use GET and PUT. It only takes a few seconds to do and will save your temper if you have a run in with the guru.

So what exactly can we achieve with GET and PUT? As the names might suggest, GET copies graphics from the screen and PUT replaces them at any position. And they do it very quickly.

To store graphics data, AmigaBasic must have somewhere that is safe to read and write to – somewhere that won't get in the way, somewhere that can be kept track of. The perfect place is in a large dimensioned array. Integer arrays – that is, arrays with a percentage sign after the variable name – are ideal because not only can we store the graphics data here, but we can examine it as well.

An array can be manipulated easily from Basic and even saved to disc, which gives us our first sneaky use – saving screen displays.

Saving the screen data on other computers has always been relatively simple because the address of the start of screen memory is usually fixed and easily accessible. Not so on the Amiga, where many screens may exist at once and few things are tied down to fixed addresses.

GET and PUT offer us an easy way to store the screens to disc, ideal for loading title pages and backdrops for your Basic programs.

Listing I will draw a pattern, save it, then clear the screen and re-load the image. Several points need to be covered. First, how did we decide on the size of the array? This is boring and I don't want to talk about it here, but if you are interested the formula can be found elsewhere in this article.

We also need to examine two strange looking Basic commands, MKI$ and CVI. The first takes an integer and turns it into a string, the second takes a string and converts it into an integer. These commands are complimentary in that if *x* equals an integer, then

```
CVI(MKI$(x))
```

is equal to *x*. The reason for bothering with such strange looking commands is to save time and space. An integer stored on disc uses three times the space as its equivalent string.

In case you were wondering, there is no need for you to save entire screens this way – by specifying the coordinates in the GET statement you can save any portion of the screen.

If you are using more than one bitplane (two colours), you may need to save the screen in parts to stop Basic crashing with an Out of Memory error. Be warned that this program will also take a long time to save the data.

The second listing is slightly more interesting. It re-draws the digits 0 through 9, GETting each in turn and storing them in an indexed array. Once they have all been stored, the program uses them to tell the time. The result is a very large digital clock, which will even tell the correct time if you have don't a real-time clock module inserted in your Amiga.

Drawing the large numbers is achieved by printing the digit at the top of the screen and then testing each pixel in turn with the POINT command. This result is then magnified by multiplying each coordinate by four and re-plotted. This stage will take a few moments from AmigaBasic and may make you wish you had a copy of HiSoft's Basic Compiler.

Once all the digits have be carefully stored away, the exciting business of telling the time can commence. The actual time is extracted from the system clock via a quick glance at

➤

➤

TIME$, and the resultant string is then parsed and each digit PUT on the screen individually.

The PSET qualifier in the PUT command is needed to prevent the large numbers being XORed with existing screen data – the default setting of PUT. Including PSET forces the image to overwrite everything instead.

Calculating array sizes

THE amount of memory which the graphics data takes up in an array depends not only on its height and width, but the number of bitplanes used as well. Bitplanes determine the number of colours which can be used in a screen display. The number of planes in a display is known as the screen's "depth".

The formula for working out the size of the integer array needed looks terribly complicated. Here it is:

```
Size.Of.Array=(6+((Height+1)*2*INT((
Wide+16)/16)*Depth))/2
```

So for our two bitplane, 32 x 32 pixel digits, it becomes:

```
Size.Of.Array=(6+(32+1)*2*INT((32+16
)/16)*2))/2
```

which works out to 201, so the dimension is declared with:

```
DIM b%(201)
```

When I was experimenting with the HiSoft Basic Compiler (v1.05) I came across a slight anomaly regarding the use of multi-dimensional arrays. Using arrays of more than one dimension with GET and PUT is perfectly legal as long as you remember the order in which the indices are specified. For example, in Listing II we dimensioned the array like this:

```
DIM b%(201,10)
```

However, with HiSoft Basic the array would have to be dimensioned in this way:

```
DIM b%(10,201)
```

Various little changes must be made to take account of this. It is only a small point, but one that kept me busy for a while as I tracked the bug down. If you are typing the listing into HiSoft Basic read the REM statements for the corrections. As it stands, the listing runs perfectly under AmigaBasic – no mean feat!

Listing II also shows how several large graphics can be stored and used later at any point on the screen. If you really liked the clock program, but were tired of waiting for all the digits to be drawn and stored, you could save them to disc just like we saved the screen data. This would save time when you came to run the program again.

Storing multiple images in an array gives great scope for animation. Several frames of motion could be stored in each element of the array and cycled through to create the illusion of movement. Until the next time we meet, try playing with some wire-frame graphics and animating them with GET and PUT.

```
' Loading and saving screen displays
' from Basic using GET and PUT.
'
' ©1990 Copyright Amiga Computing.
'
' Open a single bitplane
' PAL screen and window.
'
  SCREEN 1,320,256,1,1:WINDOW 2,,,0,1
'
' Reserve some space.
'
  DIM s%(6745)
'
  DEFINT a-z
'
' Create a quick demo screen.
'
  FOR x=0 TO 320 STEP 4
    LINE (x,256)-(160,0)
    LINE (x,0)-(160,256)
  NEXT x
'
' Get and save screen data.
'
  GET (0,0)-(320,256),s%
  OPEN "screendata" FOR OUTPUT AS 1
  FOR a=0 TO 6745
    PRINT#1,MKI$(s%(a));
  NEXT a
  CLOSE 1
'
CLS
'
' Load and display the screen data.
'
  OPEN "screendata" FOR INPUT AS 1
  FOR a=0 TO 6745
    s%(a)=CVI(INPUT$(2,1))
  NEXT a
  CLOSE 1
  PUT (0,0),s%
'
END
```

Listing I

```
' Use GET and PUT to make big numbers
' and use TIME$ to show the time.
' ©1990 Copyright Amiga Computing.
'
' Open a new pal screen with two bit
' planes and accompanying window.
'
  SCREEN 1,320,256,2,1:WINDOW 2,,,0,1
'
' Reserve some space
' for GET to play with.
' In Hisoft Basic replace
' with DIM b%(10,201).
'
  DIM b%(201,10)
  CALL create.digits(b%())
  CLS
'
' The time generation
' part of the program.
'
a.loop:
  t$=TIME$
  IF ot$=t$ THEN a.loop
  ot$=t$
  CALL draw.numbers(t$,b%())
  GOTO a.loop

' -----------------------------------
' Sub-program to GET all digits 0-9.
' -----------------------------------
SUB create.digits(b%()) STATIC
  FOR a=0 TO 9
'   Draw numeral in top of screen.
    CLS:LOCATE 1,1:PRINT a
'   Scan it pixel by pixel.
    FOR x=0 TO 8 STEP .25
'     Then draw it and a shadow.
      FOR y=0 TO 8 STEP .25
        IF POINT(x+8,y)<>0 THEN PSET
(104+x*4,108+y*4),2
        IF POINT(x+8,y)<>0 THEN PSET
(100+x*4,100+y*4),3
      NEXT y
    NEXT x
'
'   The magic GET statement.
'   For HiSoft Basic use:
'   get (100,100)-(132,132),b%(a,0)
'
    GET (100,100)-(132,132),b%(0,a)
  NEXT a
END SUB

' --------------------------------
' Draw time string, digit by digit.
' --------------------------------
SUB draw.numbers(t$,b%()) STATIC
  x=0:y=50
  FOR q=1 TO LEN(t$)
    x=x+35
    w=ASC(MID$(t$,q,1))-48
    IF w>9 THEN x=x-25
'   Put the correct digit on screen.
    PUT (x,y),b%(0,w),PSET
'   HiSoft = PUT (x,y),b%(w,0),PSET
  NEXT q
END SUB
```

Listing II

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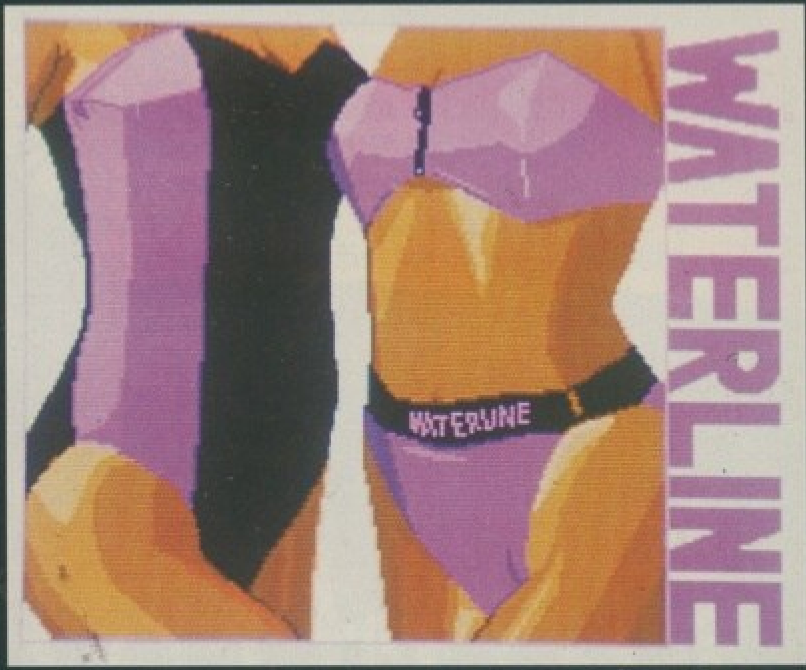


JONATHAN READ was born in England 18 years ago. He moved to New Zealand late in 1987, which is where he first discovered the Amiga. In 1988 he persuaded his parents to splash out on an Amiga 500 and colour monitor, but it wasn't until 1989 that he began using Deluxe Paint II to produce some serious artwork.

He's off to Waikato Polytechnic this year to do a course in graphic design, where he hopes to gain enough knowledge to start up his own computer graphics company and retire a billionaire on his 35th birthday. Failing that Jonathan will settle for a job in an advertising company.

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On the right track

Oliver Prill show you how to use machine code to open up a window on where your read/write head is hanging out

TRACKDISPLAY is a software solution to the floppy drives which have an LED display at the front to show the current track position. This can be very useful – you can see where read and write errors occur, for example.

The program emulates this by printing the current track, sector and block positions into a small multi-tasking window on the Workbench screen. It shows you the name of the disc in the drive, which will be renewed when you insert another one.

It is best to start TrackDisplay from the CLI with the run command. If you want to show the positions for all your drives, simply start TrackDisplay for all your drives and drag the windows to where you want them. So the syntax is:

```
run trackdisplay dfn:
```

where n must be a number from 0 to 3, because you can only connect up to three external drives to the Amiga.

If you just type run trackdisplay you will get some information on the program and how to use it. If you run the program for a drive which is not connected or not valid, it will tell you in your current CLI window.

Do not type the drive number in capital letters, always use lower case. If you attach a tool icon to it, TrackDisplay will run from the Workbench, but only for drive df0:.

The programmer

OLIVER Prill is an 18-year-old German student doing his second year A levels. He has an A1000, bought in 1986, 512k memory, two floppies and a Star NL-10 printer. He says he will soon upgrade to at least 1 meg, but these upgrades are still quite expensive for the A1000.

His main interest is programming, and from time to time using a word processor or playing a game with friends. He started programming in assembler on the C64 in 1984 and then continued on the Amiga. If he has some spare time this year he fancies his chances at writing a game.

```
; TrackDisplay by Oliver Prill.
; (c) Copyright 1990 Amiga Computing.

 section main,code_c ; Use chip mem.

 tst.l d0
 beq workbench

cli:
 cmp.b #"d",(a0)
 bne syntax
 cmp.b #"f",1(a0)
 bne syntax
 cmp.b #":",3(a0)
 bne syntax
 move.b 2(a0),d0
 sub.b #48,d0
 move.b d0,drive
 bra start

workbench:
 move.l 4,a6
 move.l #0,a1
 jsr -294(a6)
 move.l d0,a4
 tst.l $ac(a4)
 bne start
 move.l 4,a6
 lea $5c(a4),a0
 jsr -384(a6)
 jsr -372(a6)
 move.b #0,drive

; Check if drivenumber exists.
start:
 clr.l d0
 cmp.b #3,drive ; Bigger than 3?
 bgt error1
 cmp.b #0,drive ; Or less than 0?
 blt error1

; Open libraries and devices.
 jsr openlibs

; Open trackdisk.device
opendevs:
 move.l 4,a6
 sub.l a1,a1
 jsr -294(a6)
 move.l d0,readreply+16
 lea readreply,a1
 jsr -354(a6)
 clr.l d0
 move.b drive,d0
 clr.l d1          ; No flags.
 move.l #diskio,a1 ; trackdisk.device
                   ; structure.
 move.l #trackdisk,a0
 jsr -444(a6)
 tst.l d0
 bne error2

; Write actual screen into screenhd
 move.l intbase,a6
 move.l 56(a6),screenhd

; Write drive number
; into window structure.
 move.b drive,d0
 add.b #48,d0
 move.b d0,windowtitle+8

; Open window.
 move.l intbase,a6
 move.l #windowstructure,a0
 jsr -204(a6)
```

```
 move.l d0,windowhd

; Write text into window.
 move.l gfxbase,a6
 move.l #8,d0
 move.l #17,d1
 move.l windowhd,a1
 move.l 50(a1),a1
 jsr -240(a6)              ; Move.
 move.l windowhd,a1
 move.l 50(a1),a1
 move.l #outputtxt,a0
 move.l #17,d0
 jsr -60(a6)               ; Text.
 move.l gfxbase,a6
 move.l #8,d0
 move.l #25,d1
 move.l windowhd,a1
 move.l 50(a1),a1
 jsr -240(a6)              ; Move.
 move.l windowhd,a1
 move.l 50(a1),a1
 move.l #voltxt,a0
 move.l #9,d0
 jsr -60(a6)               ; Text.

; Get disk name.
 jsr checkchange

print:
;
; Renew every 10*(1/50) seconds.
;
 move.l dosbase,a6
 move.l #10,d1
 jsr -198(a6)
;
; Check if chosen drive is connected.
;
 move.l diskio+20,a0 ; start of
                     ; device
                     ; structure
 clr.l d0
 move.b drive,d0
 mulu #4,d0
 move.l 36(a0,d0),a2
 cmp.l #0,a2
 beq quit
;
; Get track, sector and find block.
;
 move.w 72(a2),d1 ; Get sector.
 move.w 74(a2),d2 ; Get track.
 move.l d2,d3
 mulu #11,d3
 add.w d1,d3
 cmp.w block,d3  ; Has block changed?
 beq wait        ; No, don't renew.
;
; Save track, sector & block in stack
;
 move.w d1,ssector
 move.w d2,strack
 move.w d3,sblock
 clr.l d1
 clr.l d2
 clr.l d3
;
; Get new track and print.
;
 move.l gfxbase,a6
 move.l #3*8,d0
 move.l #17,d1
 move.l windowhd,a1
 move.l 50(a1),a1
 jsr -240(a6)
 move.l #100,d1
 move.w strack,d0
 jsr subprint
;
; Get new sector and print.
;
 move.l gfxbase,a6
 move.l #9*8,d0
 move.l #17,d1
 move.l windowhd,a1
 move.l 50(a1),a1
 jsr -240(a6)
 move.l #10,d1
 move.w ssector,d0
 jsr subprint
;
; Get new block and print.
;
 move.l gfxbase,a6
 move.l #14*8,d0 ; cursor * pos 14
                 ;(1 char = 8 pixels)
 move.l #17,d1
 move.l windowhd,a1
 move.l 50(a1),a1
 jsr -240(a6)

 move.l #1000,d1
 move.w sblock,d0
 move.w d0,block  ; Save for
                  ; later check.
 jsr subprint

; Check if close gadget has been used
wait:
 move.l windowhd,a0
 move.l 86(a0),a0
 move.l 4,a6
 jsr -372(a6)
 move.l d0,a0
 move.l 20(a0),d6
 tst.l d0
 bne quit

; Check if disk inserted.
 lea diskio,a1
 move.w #14,28(a1)
 move.l 4,a6
 jsr -456(a6)
 cmp.l #$0,32(a1)
 bne diskchange
 bra print

; Open libraries.
openlibs:
 move.l 4,a6
 move.l #gfxname,a1
 clr.l d0
 jsr -408(a6)
 move.l d0,gfxbase
 move.l #intname,a1
 clr.l d0
 jsr -408(a6)
 move.l d0,intbase
 move.l #dosname,a1
 clr.l d0
 jsr -408(a6)
 move.l d0,dosbase
finish:
 rts

; Close libraries.
closelibs:
 move.l 4,a6
 move.l gfxbase,a1
 jsr -414(a6)
 move.l intbase,a1
 jsr -414(a6)
 move.l dosbase,a1
 jsr -414(a6)
 rts

; Error, invalid drive number.
error1:
 jsr openlibs
 clr.l d0
 move.l dosbase,a6
 jsr -60(a6)
 move.l d0,d1
 move.l #errortxt1,d2
 move.l #err1end-errortxt1,d3
 move.l dosbase,a6
 jsr -48(a6)
 jsr closelibs
 clr.l d0
 rts

; Finish program.
quit:
 jsr closedevs
 jsr closewind
 jsr closelibs
 rts

; Error, drive not connected.
error2:
 clr.l d0
 move.l dosbase,a6
 jsr -60(a6)
 move.l d0,d1
 move.l #errortxt2,d2
 move.l #err2end-errortxt2,d3
 move.l dosbase,a6
 jsr -48(a6)
 jsr closelibs
 move.l 4,a6
 lea readreply,a1
 jsr -360(a6)
 clr.l d0
 rts

; Close window.
closewind:
 move.l intbase,a6
 move.l windowhd,a0
 jsr -72(a6)
 rts

; Print the new track, sector and
; block positions.
subprint:
 move.l d0,d2
 divu d1,d2
 move.l d2,d3
 mulu d1,d2
 sub.w d2,d0
 divu #10,d1
 move.l d0,saved0
 move.l d1,saved1
 add.w #48,d3
 move.b d3,string
 move.l gfxbase,a6
 move.l windowhd,a1
 move.l 50(a1),a1
 move.l #string,a0
 move.l #1,d0
 jsr -60(a6)
 move.l saved0,d0
 move.l saved1,d1
 cmp.w #0,d1
 bne subprint
 rts

; Check for disk and close gadget.
diskchange:
```

➤

```
 move.l gfxbase,a6
 move.w #8,d0
 move.w #33,d1
 move.l windowhd,a1
 move.l 50(a1),a1
 jsr -240(a6)
 move.l windowhd,a1
 move.l 50(a1),a1
 move.l #nodisk,a0
 move.l #18,d0
 jsr -60(a6) ; Print No disk in drive

 jsr checkchange
 cmp.l #1,gadget ; Close gadget used
 beq quit        ; while no disk
 bra print       ; in drive.

; Wait until disk is in drive.
checkchange:
 move.l windowhd,a0
 move.l 86(a0),a0
 move.l 4,a6
 jsr -372(a6)
 move.l d0,a0
 move.l 20(a0),d6
 tst.l d0
 bne closegaddout
 lea diskio,a1
 move.w #14,28(a1)
 move.l 4,a6
 jsr -456(a6)
 cmp.l #0,32(a1)
 bne checkchange
 move.l #diskio+32,a0 ;Clear
 clr.l (a0)           ;error.
 jsr readdiskname
 rts

closegaddout:
 move.l #1,gadget
 rts

; read sector 880 and print disk name
readdiskname:
 lea diskio,a1
 move.l #readreply,14(a1)
 move.w #2,28(a1)          ; Read.
 move.l #buffer,40(a1)
 move.l #512,36(a1)        ; 1 sector.
 move.l #880*512,44(a1)    ; Start at
                           ; root.
 move.l 4,a6
 jsr -456(a6)
 lea diskio,a1
 move.w #9,28(a1)          ; Motor
 move.l #0,36(a1)          ; off.
 jsr -456(a6)
;
; Clear old disk name
;
 move.l gfxbase,a6
 move.w #8,d0
 move.w #33,d1
 move.l windowhd,a1
 move.l 50(a1),a1
 jsr -240(a6)              ; Move.
 move.l windowhd,a1
 move.l 50(a1),a1
 move.l #clearline,a0
 move.l #18,d0
 jsr -60(a6)
;
; Print new name.
;
 move.l gfxbase,a6
 move.w #8,d0
 move.w #33,d1
 move.l windowhd,a1
 move.l 50(a1),a1
 jsr -240(a6)              ; Move.
 move.l windowhd,a1
 move.l 50(a1),a1
 move.l #buffer+433,a0
 move.b buffer+432,d0
 cmp.b #18,d0 ; Name > than 18 chars?
 ble shortname ; Yes, print.
 move.b #18,d0 ; No, change name
               ; to 18 chars.
shortname:
 jsr -60(a6)
 rts

; Close trackdisk.device.
closedevs:
 move.l 4,a6
 lea readreply,a1
 jsr -360(a6)
 move.l #diskio,a1
 jsr -450(a6)
```

```
 rts

; Print syntax of program.
syntax:
 jsr openlibs
 clr.l d0
 move.l dosbase,a6
 jsr -60(a6)
 move.l d0,d1
 move.l #syntaxtxt,d2
 move.l #syntaxend-syntaxtxt,d3
 move.l dosbase,a6
 jsr -48(a6)
 jsr closelibs
 clr.l d0
 rts

; Parameter area.

syntaxtxt:
 dc.b $a
 dc.b "TrackDisplay by Oliver Prill."
 dc.b $a
 dc.b "(c)1990 Amiga Computing."
 dc.b $a
 dc.b "SYNTAX: run trackdisplay "
 dc.b "<df0:|df1:|df2:|df3:>"
syntaxend:
 even

;
; 18 spaces between the quotes below.
;
clearline: dc.b "                  "
 even
nodisk: dc.b "-No disk in drive-"
 even

saved0: dc.l 0
saved1: dc.l 0
gadget: dc.l 0
strack: dc.w 0
ssector: dc.w 0
sblock: dc.w 0

errortxt1:
 dc.b "Invalid drive number.",$a
err1end:
 even

errortxt2:
 dc.b "Drive is not connected.",$a
err2end:
 even

trackdisk: dc.b "trackdisk.device",0
 even

windowhd: dc.l 0

windowstructure:
 dc.w 475,0,165,37
 dc.b 2,1
 dc.l $200,14,0,0,windowtitle

screenhd:
 dc.l 0,0
 dc.w 165,37,165,37,1
windowtitle: dc.b "Drive df : ",0
 even

string: dc.w 0
diskio: ds.l 20
block: dc.w 0
drive: dc.b 0
 even

voltxt:
 dc.b "Diskname:"
 even

gfxname: dc.b "graphics.library",0
 even
gfxbase: dc.l 0

intname: dc.b "intuition.library",0
 even
intbase: dc.l 0

dosname: dc.b "dos.library",0
 even
dosbase: dc.l 0

outputtxt: dc.b "T:000 S:00 B:0000",0
 even

readreply: ds.l 8
buffer: ds.b 512

 end
```


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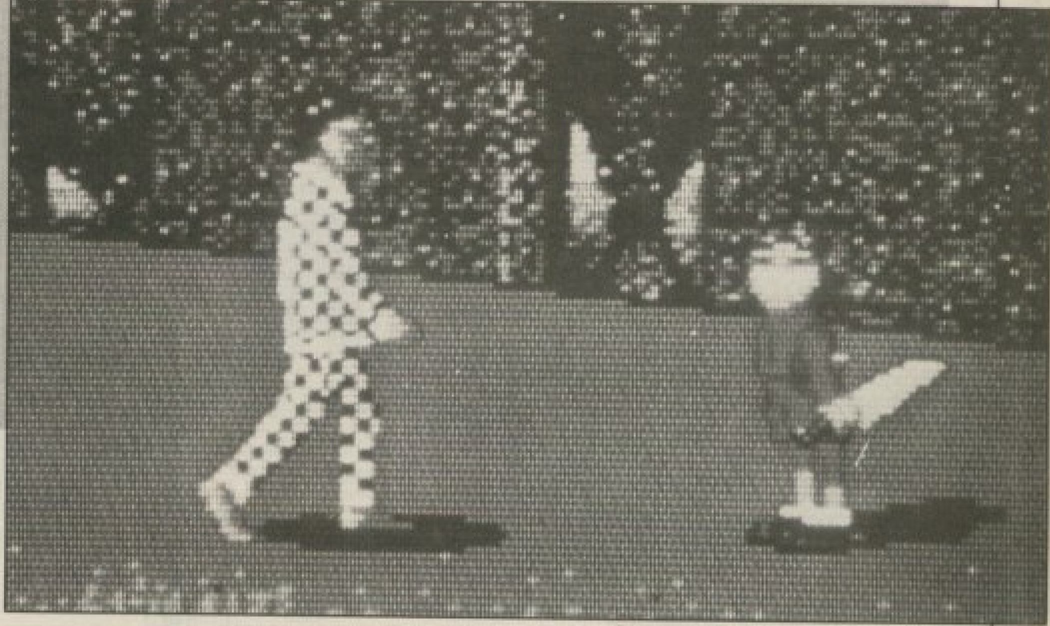
Game Killer

Space Ace

PIOTR GORCZYNSKI says: I have subscribed to Amiga Computing since November 89. Unfortunately I receive it a month late because I live in Warsaw, Poland. Still, games benefit from having some time before the cheats are revealed. The solution to Space Ace is: Right, Left, Down- Right, Left, Left, Left-Down, Up-Up-Fire-Right, Up-Right, Right-Down, Right-Down, Left-Fire-Up-Up-Up-Right-Up-Right-Left-Left-Right-Up-Fire- Fire-Fire-Fire, Right-Fire, Down-Fire-Up, Down-Right, Down-Fire, Left, Right, Right, Left, Right, Left, Right. Of course, you'll need to sort out the timing.

Weird Dreams

MAX TENNANT says: Here is a tip I found myself, so all you sissy tipsters, here is a way to get the most out of the Rainbird game. Infinite lives. Walk into the mirror on the right. Just before you go all the way through, tap out SOS in morse code on the Help key. That is dot, dot, dot, dash, dash, dash, dot, dot, dot. The lives count will turn into an infinity symbol. Keep on walking to see Emily play.



Arkanoid II

GEORGE CHRISTOVDIAS says: When the title screen for Arkanoid II comes on press caps lock and type MAGENTA, then press S while playing to open the gates to the next level.

International Karate +

MARK HAYES says: You can make any of the players invincible on the fighting stages by pressing the spacebar when a player has just been hit. When he hits the ground tap space, then press fire to continue. The invincibility lasts until the end of the round. This is all you need to progress beyond the black belt to reach Megahero status.

Write to Max

GAME KILLER is always on the look-out for hot tips, so if you have found a cheat mode, bug or written a poke then drop it in the post – on disc if it is a long listing. If your work is used I'll send you a game drawn at random from the goodie box.

To speed up getting the prize to you please cut out, photocopy or copy this form. It will be used as the address label to send out your parcel so please write neatly. Remember you have signed this to say that you haven't pinched the tip. If a friend told it to you find out how he got to know. Else I'll visit you.

Name ....

Address ....

.... Telephone ....

I have supplied tips/pokes/cheats for ....

....

....

....

.... (list games)

I confirm that the information I have supplied is mine, it hasn't been published elsewhere and I haven't sent it to anyone else.

Send this form to Max "The Hax" Tennant, Game Killer, Amiga Computing, Second Floor, North House, 78-84 Ongar Road, Brentwood, Essex, CM15 9BG.

Signature .... Date ....

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Whether you want to write action-packed games, stunning demos, stimulating educational software or even a database, AMOS is the perfect package for your Amiga.

AMOS has its own super-fast music module and comes with convert routines for Soundtracker, Sonix and GMC. There's even a command called VUMETER which allows you to link animation to sound. You can also substitute a new music routine at a later date if you want – AMOS is that flexible.

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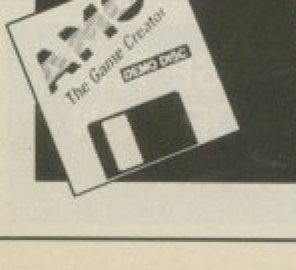
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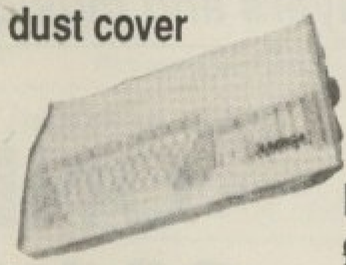
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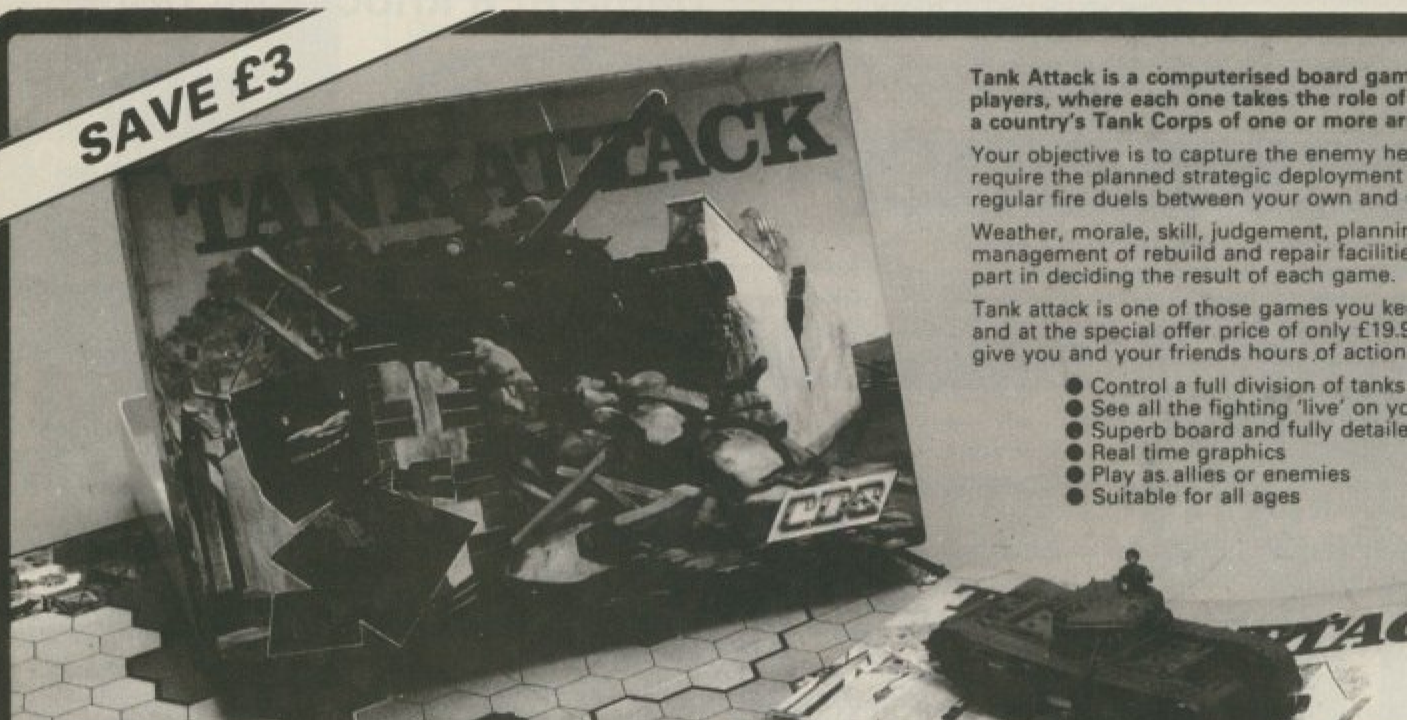
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Much ado about nothing

THERE is never any shortage of things to review at *Amiga Computing*, but we choose our reviewers carefully and sometimes there is Nothing for a particular expert to do. One day DJ Walker Morgan, one of the less tame Unix experts, breezed into the office and asked what there was for him to do.

"Well 'Nothing'" said Simon the ed. "What?" replied DJ, " " he said, "it's a new product for the Amiga". DJ smiled and went home to his trusty A1000. A few days later he mailed his review to Simon using the magic of modems and Cix:

❛ Nothing dropped through my letter box. Great, I said, grabbed it and dashed up stairs. My first complaint was the documentation which was in Nothing format. Then I found it. A small one inch cube of Nothing, which if inserted carefully into the disc drive allowed you to read the full instructions.

I couldn't wait to get Nothing up and running. I plugged it in straight away. Nothing in the serial port, Nothing in the parallel port. I made sure I put Nothing in the drive chain and Nothing in the 56 pin expansion port. Then I booted my Amiga and ... Nothing.

It was wonderful. I sat there running all my favourite programs knowing Nothing was happening, and whenever I printed anything Nothing filtered the text output and added Nothing to the characters.

I strongly recommend Nothing as an all purpose product for people who don't know if they need Anything which is not available.

The folks at Nothing, though, didn't answer the phone. I dialled Nothing and all I got was a dial tone. But I have it on good authority from the designer of "Anything not available" that Nothing is compatible with PCs and Ataris.

So soon Nothing will be a standard addition to most PCs. People will point at your machine and say: "What have you got installed in that", and you can proudly say: "Nothing".❜



The team at Amiga Computing would like to thank US Gold for a keen medieval meal and knees-up at Coombe Abbey. Perhaps it might have shown better taste on our part if we hadn't turned up dressed as Batman. Pictured here are Simon "It's a rally car" Rockman, Nic "What was that sign" Veitch and Jeff "It's in that field" Walker. But which is which?

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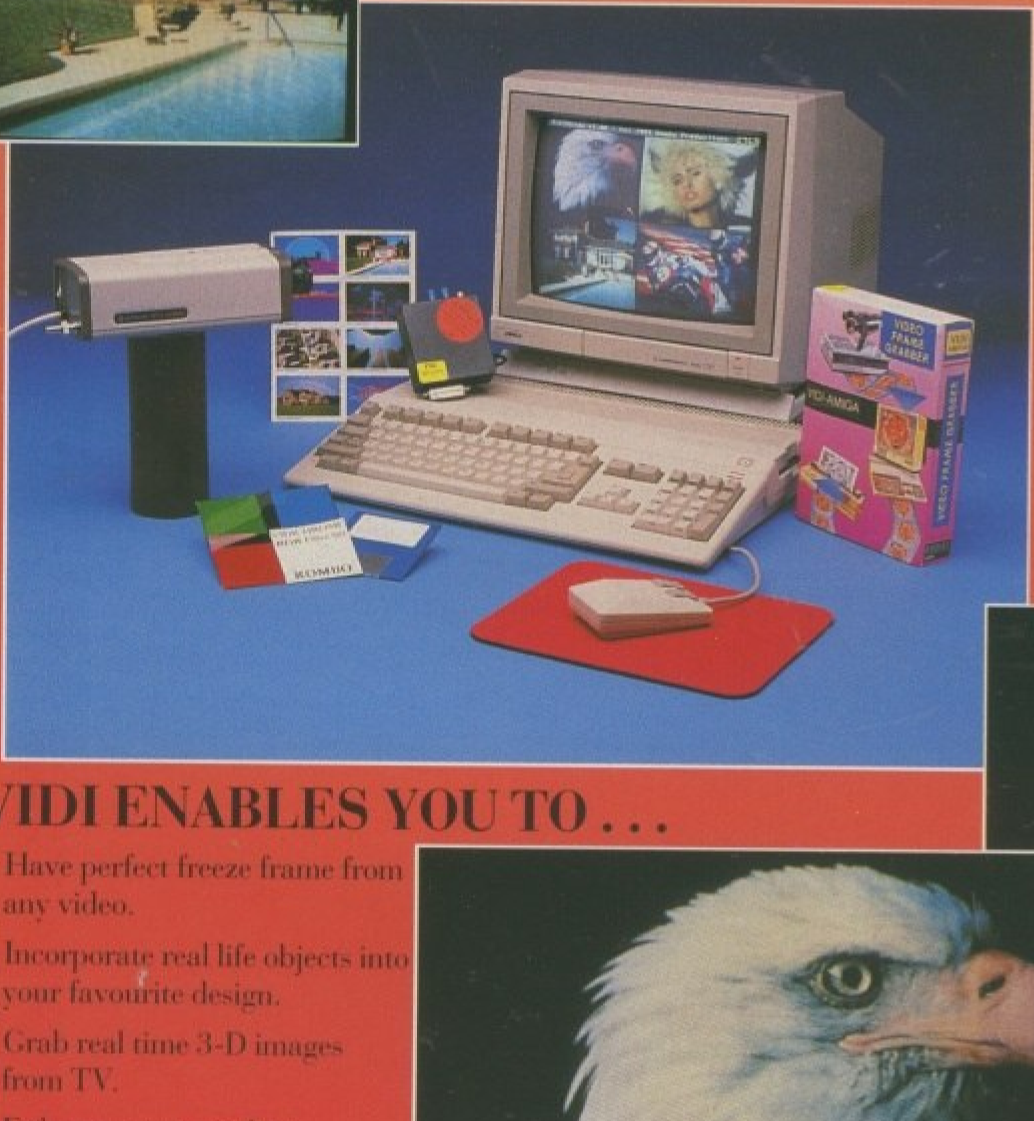


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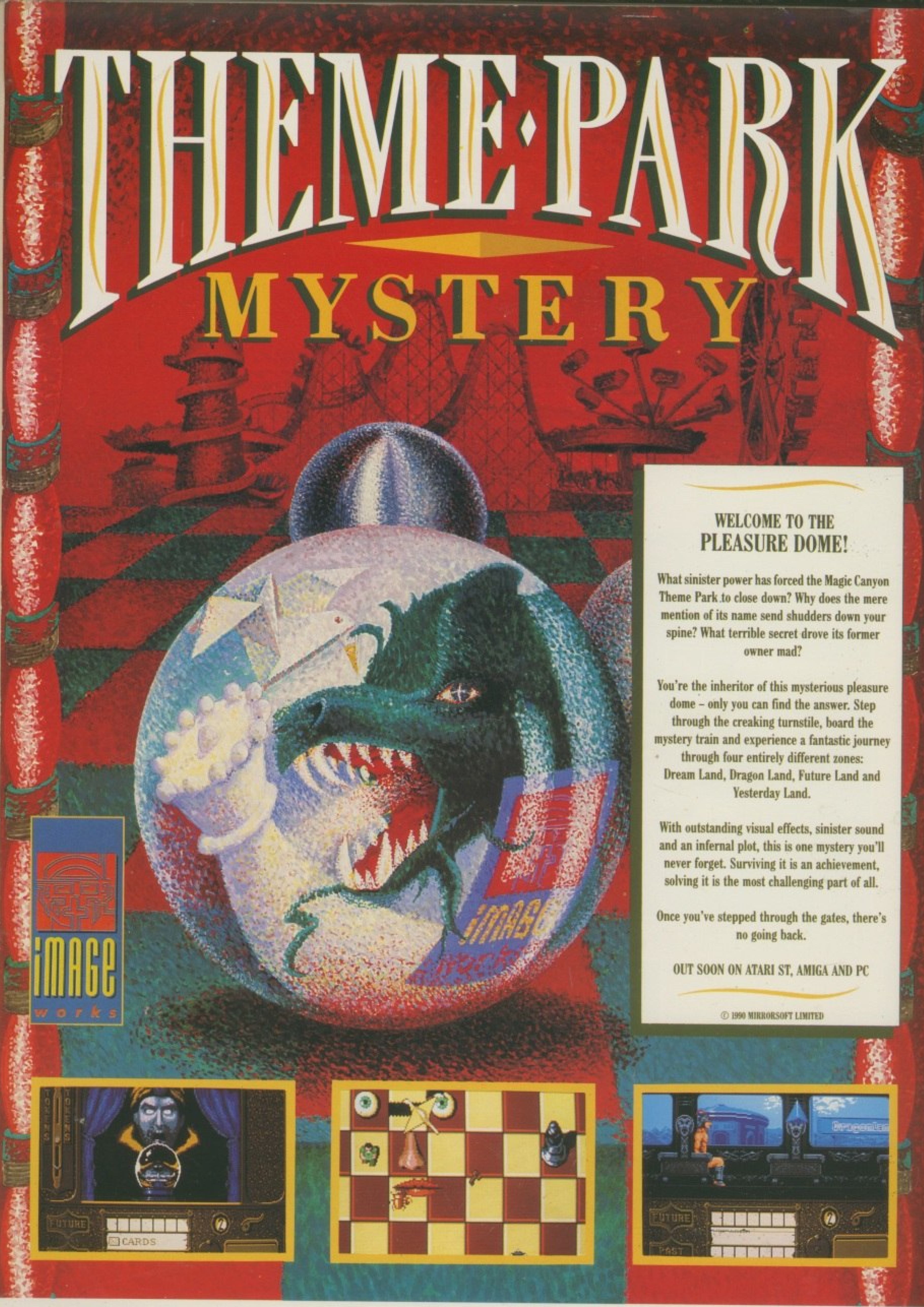
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